US008505523B1

(12) **United States Patent**
Horn

(10) **Patent No.: US 8,505,523 B1**
(45) **Date of Patent: Aug. 13, 2013**

(54) **BOW PRESS WITH ENHANCED SAFETY FEATURES**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **13/449,022**

(22) Filed: **Apr. 17, 2012**

Related U.S. Application Data

(63) Continuation-in-part of application No. 12/652,086, filed on Jan. 5, 2010, now Pat. No. 8,387,600, which is a continuation-in-part of application No. 13/100,575, filed on May 4, 2011.

(51) **Int. Cl.**
F41B 5/14 (2006.01)

(52) **U.S. Cl.**
CPC ***F41B 5/1449*** (2013.01)
USPC **124/1**; 124/86

(58) **Field of Classification Search**
CPC F41B 5/1449
USPC 124/1, 86
See application file for complete search history.

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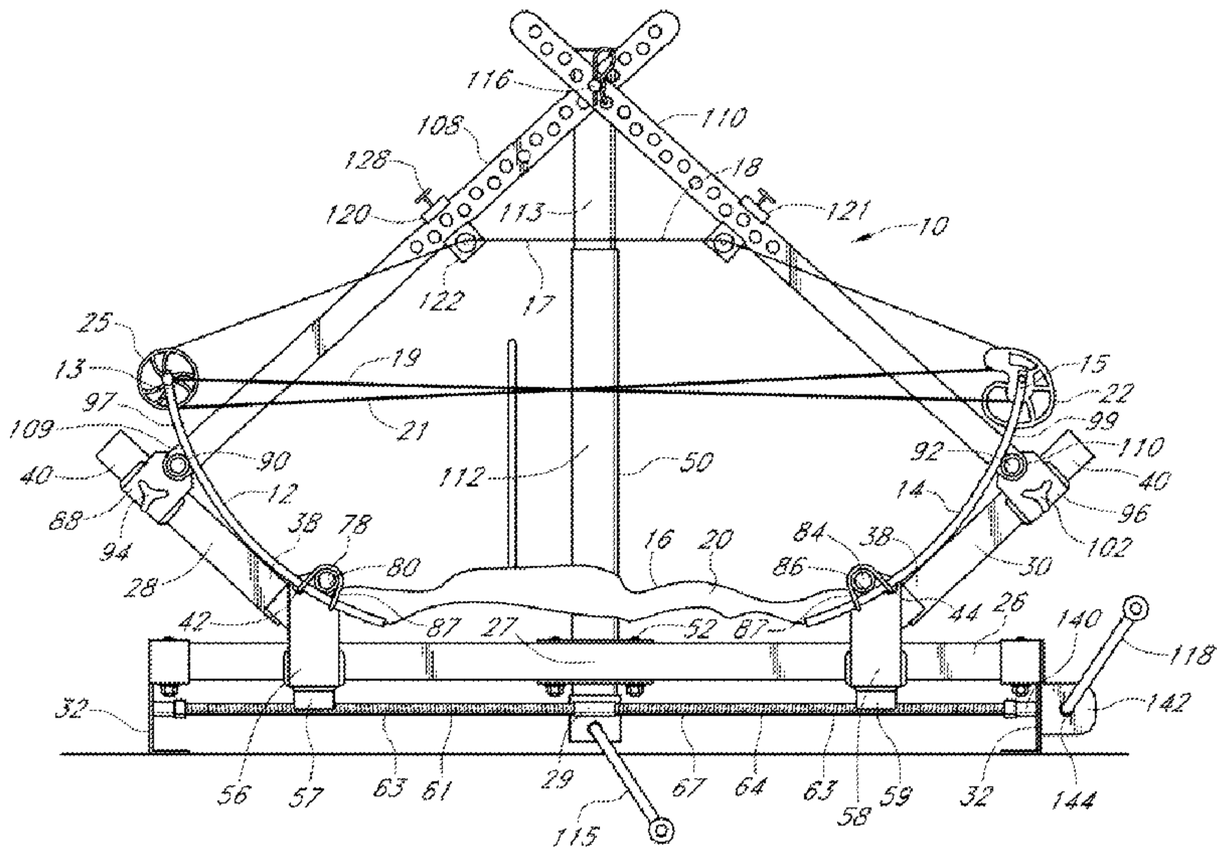
(57) **ABSTRACT**

An improved archery bow press used to safely relieve tension in the bow string of a short limbed compound archery bow. Slidable brackets are retained to a horizontal beam and retain pivot arms to the beam. Brackets slidable along each of the pivot arms may be locked in place. Each pivot arm includes a bearing member which abuts a limb of a compound bow. A jack is mounted to the beam to raise and lower link members connected to the pivot arms. The link members are adjustable in length. Markings are provided on the adjustable members so that adjustments to those elements can be made based on data in a table correlating settings for specific compound bows. Safety latches lock the bow limbs to the slidable brackets. A method for presetting the press is provided.

16 Claims, 17 Drawing Sheets



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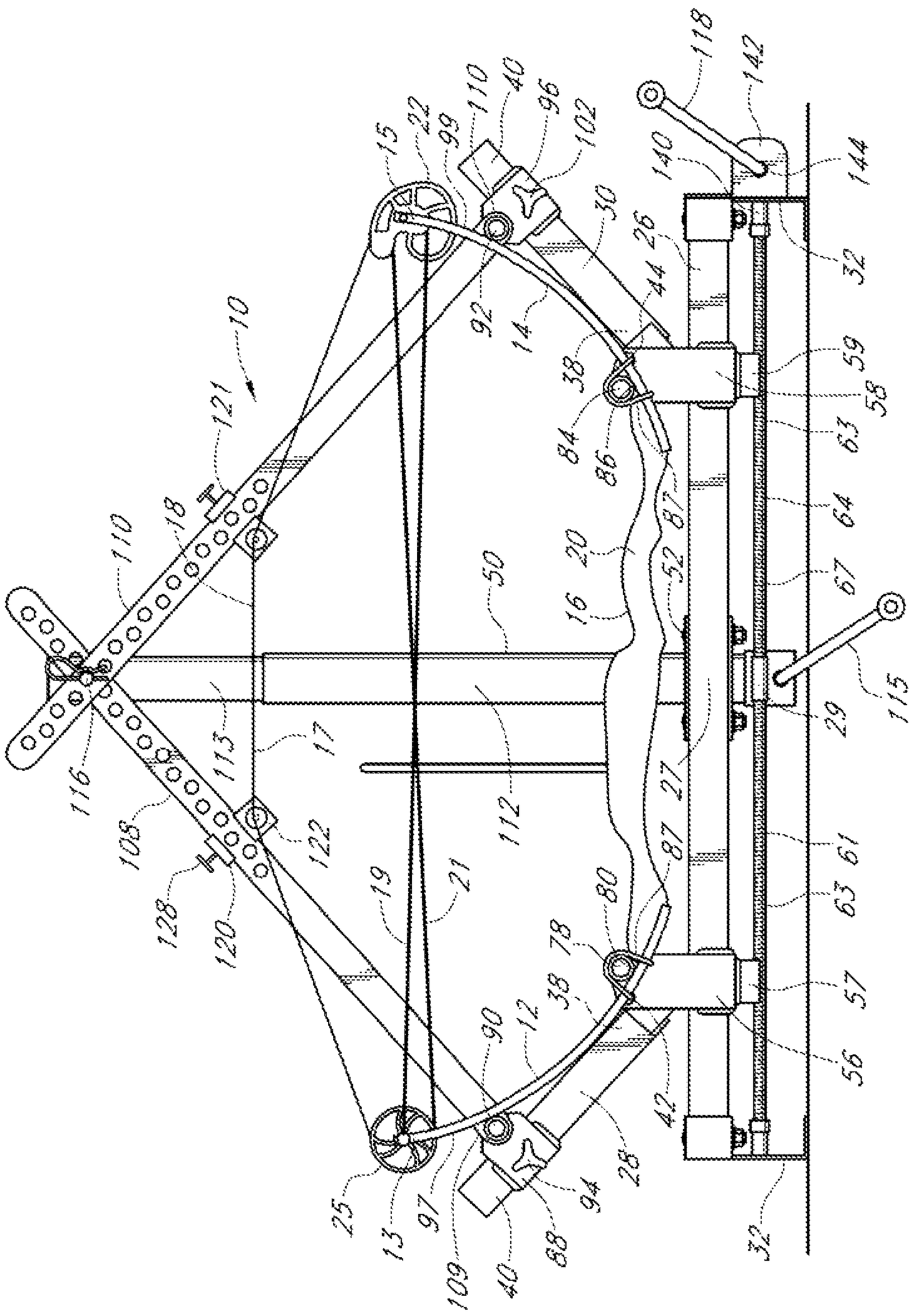
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FIG. 1

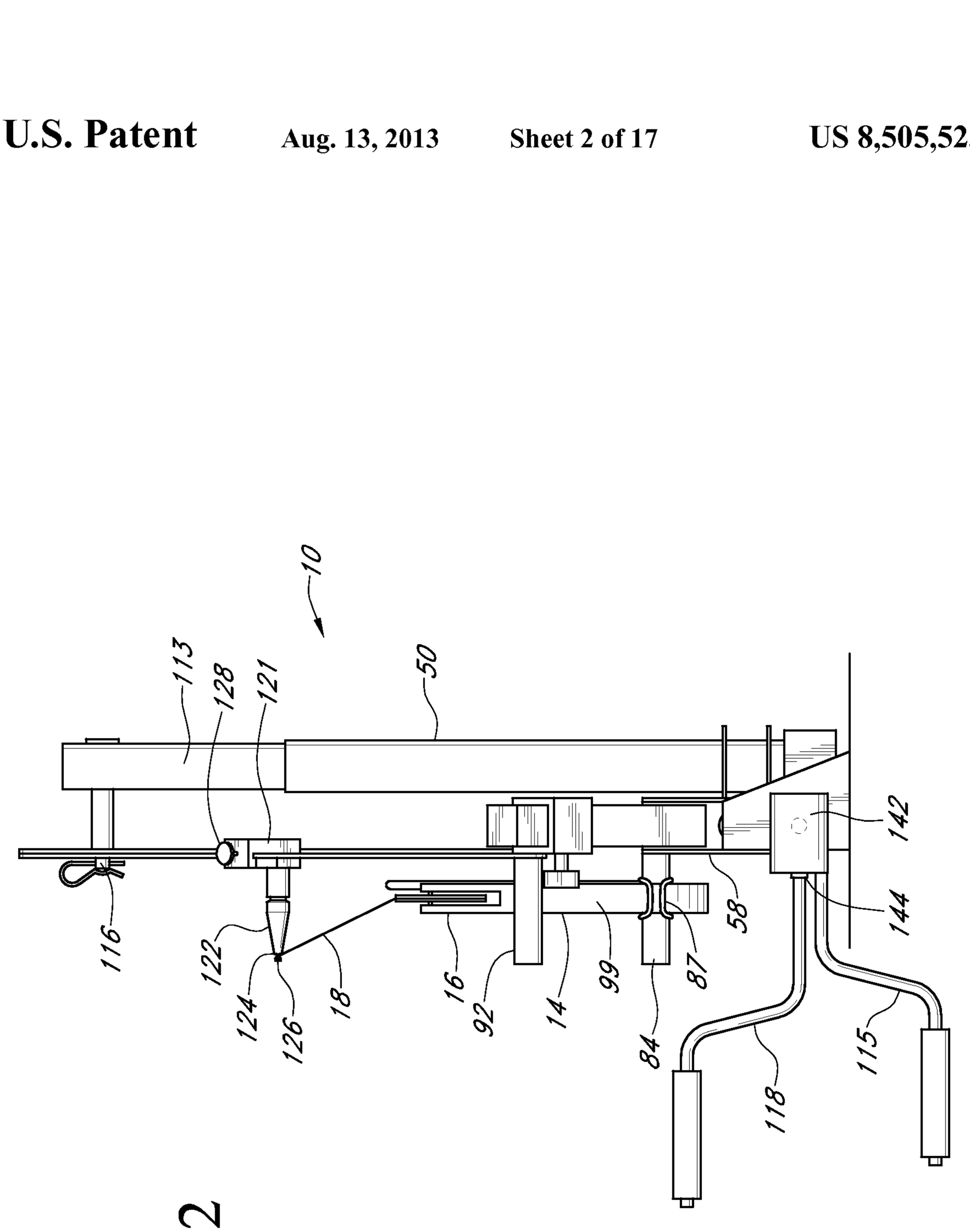
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FIG. 2

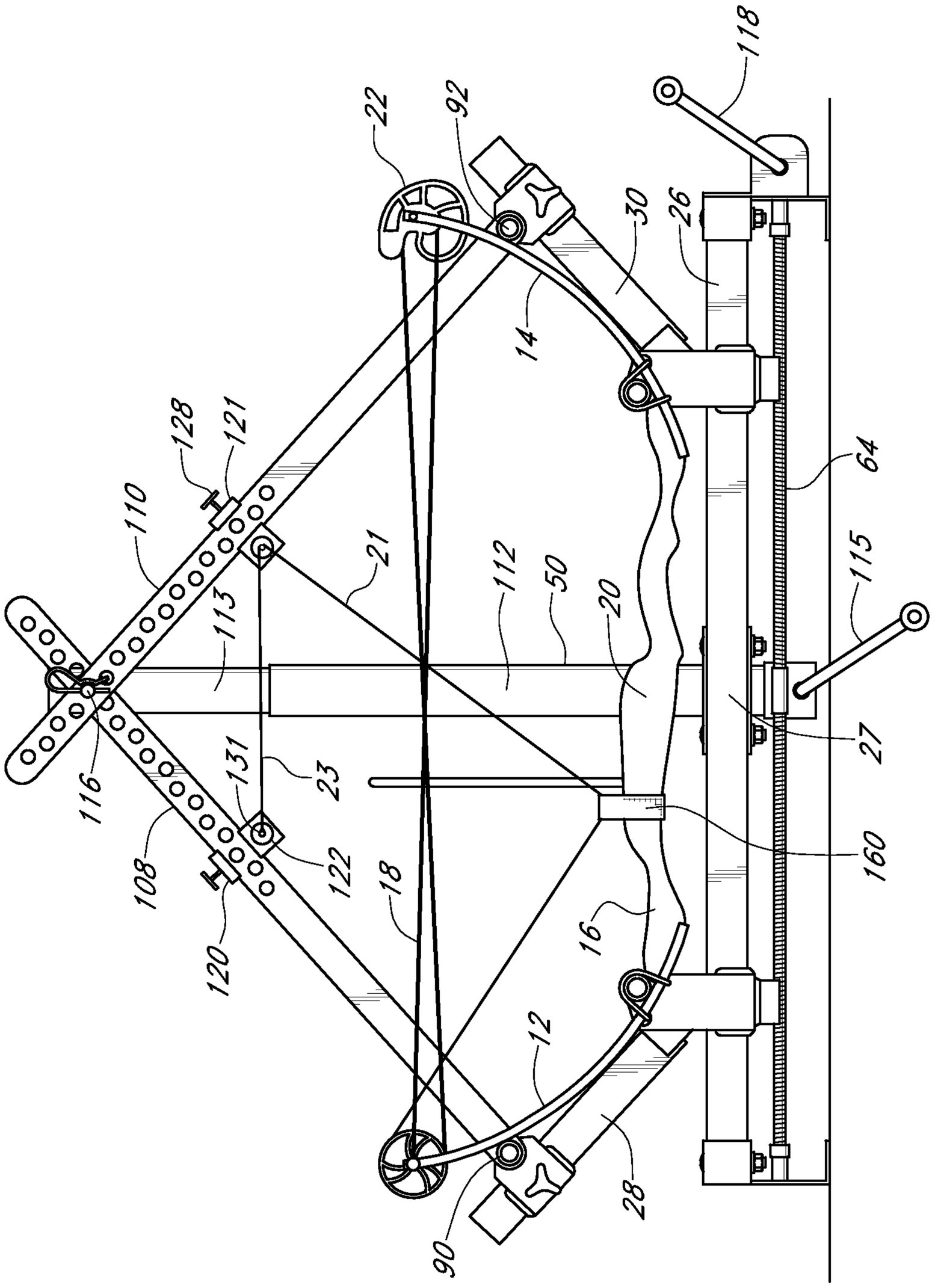
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FIG. 3

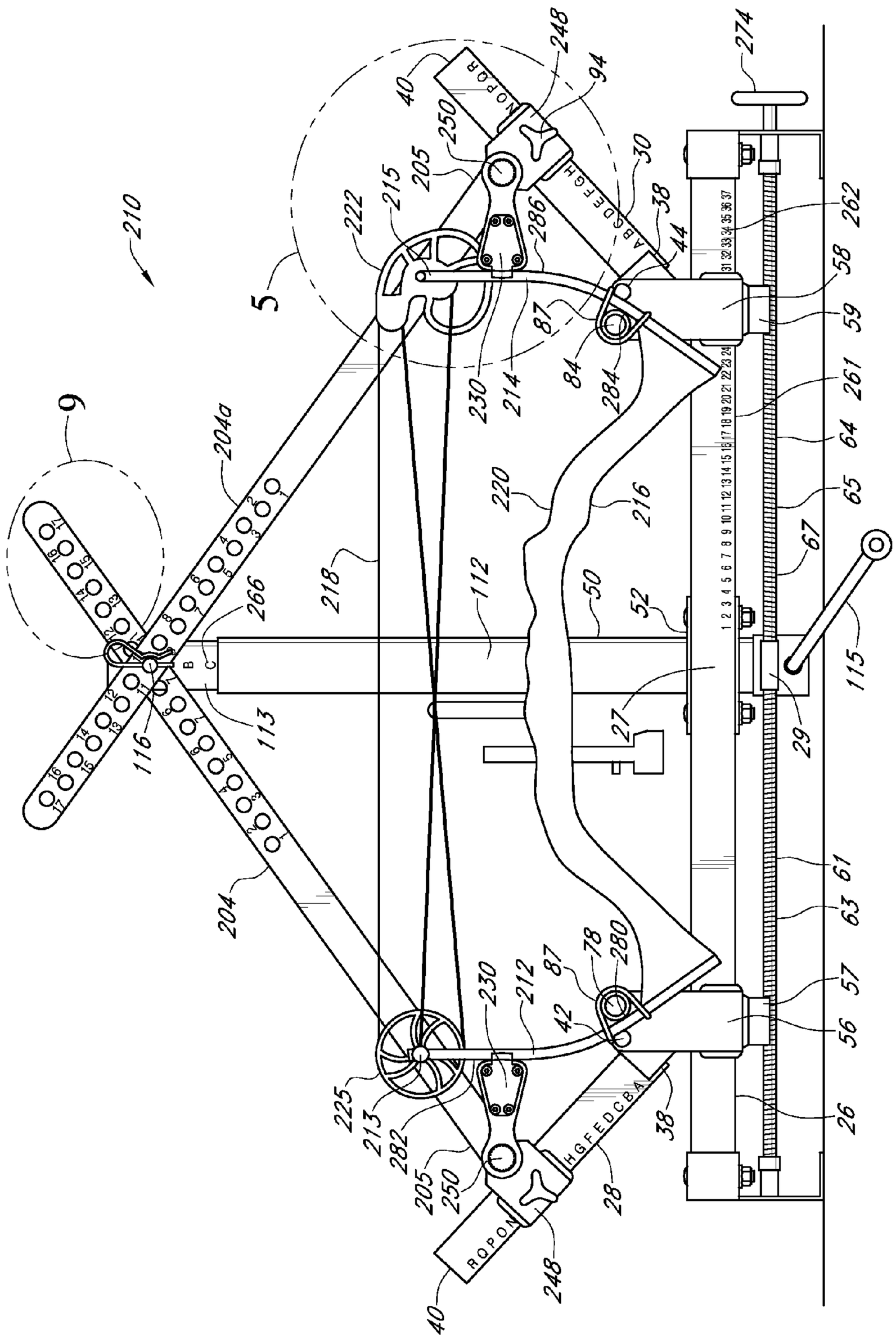
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FIG. 4

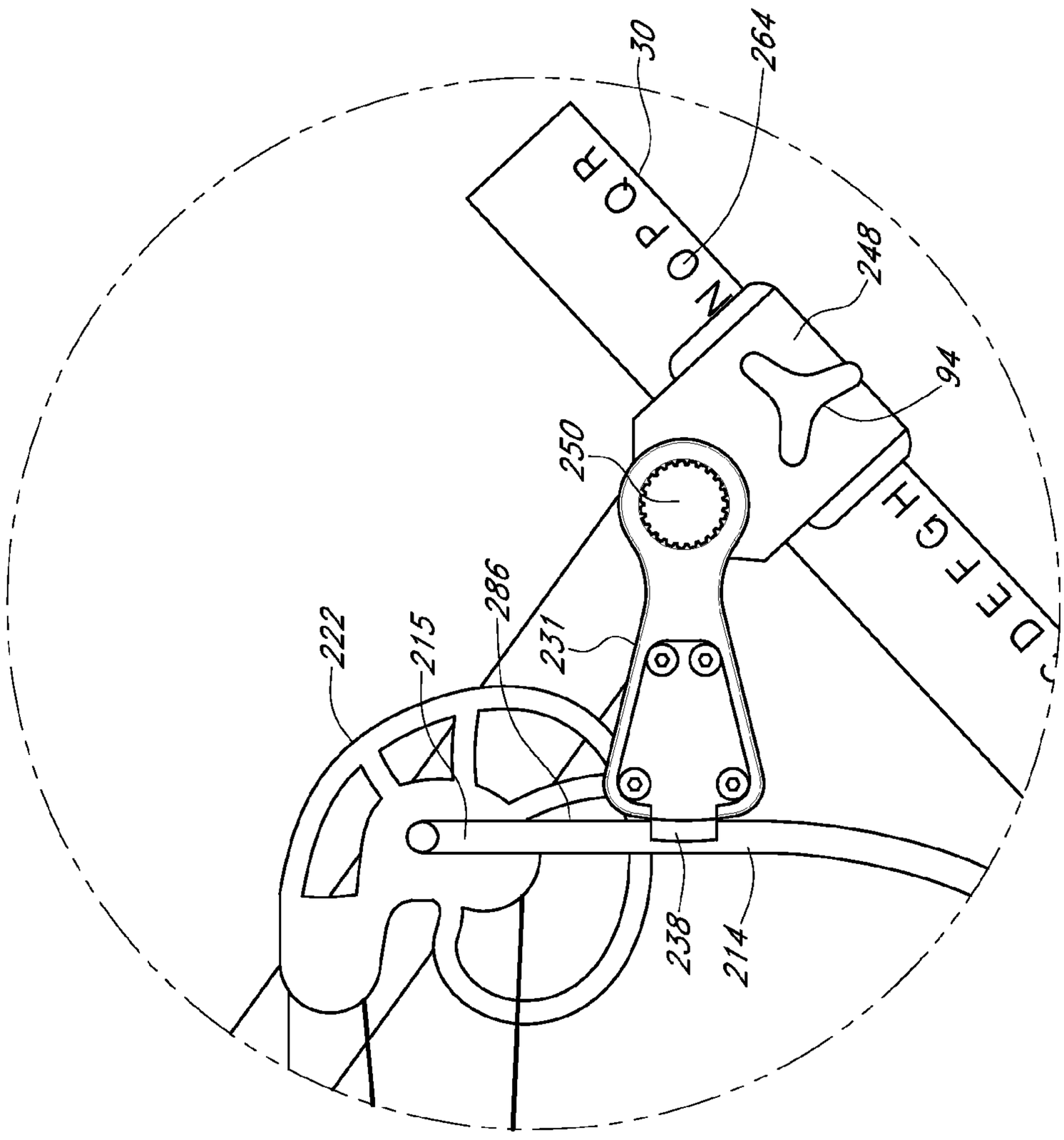
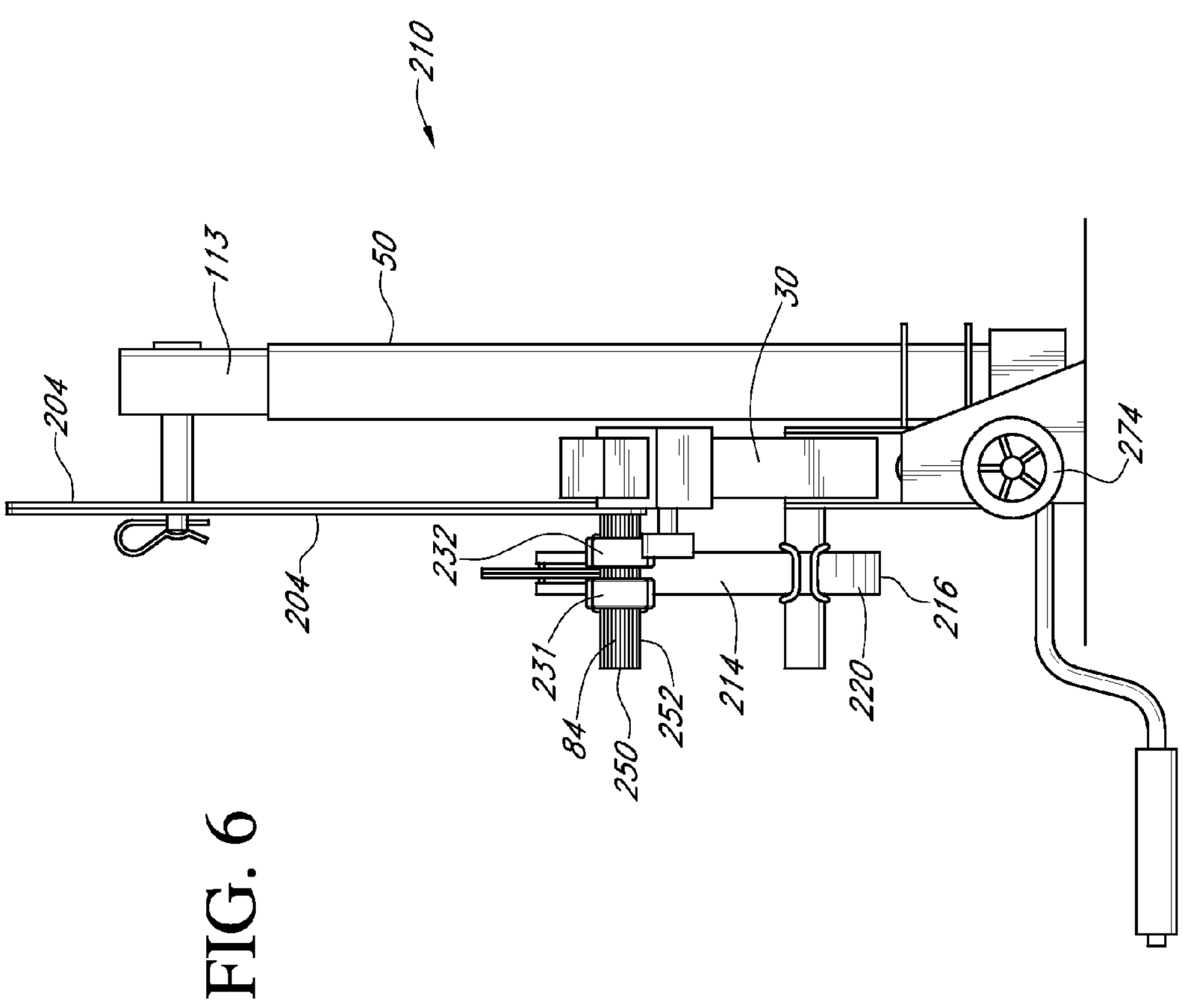


FIG. 5



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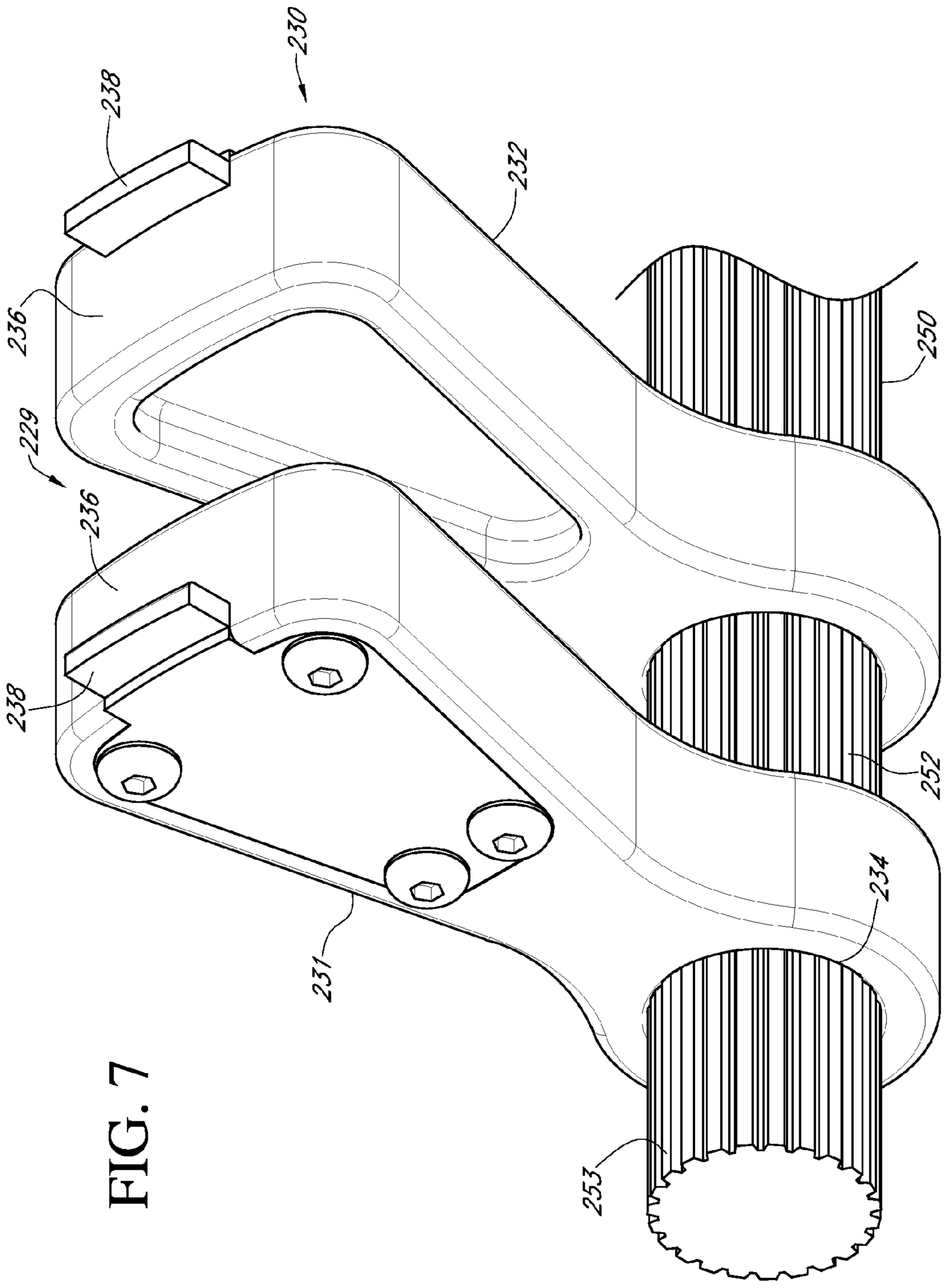

FIG. 7

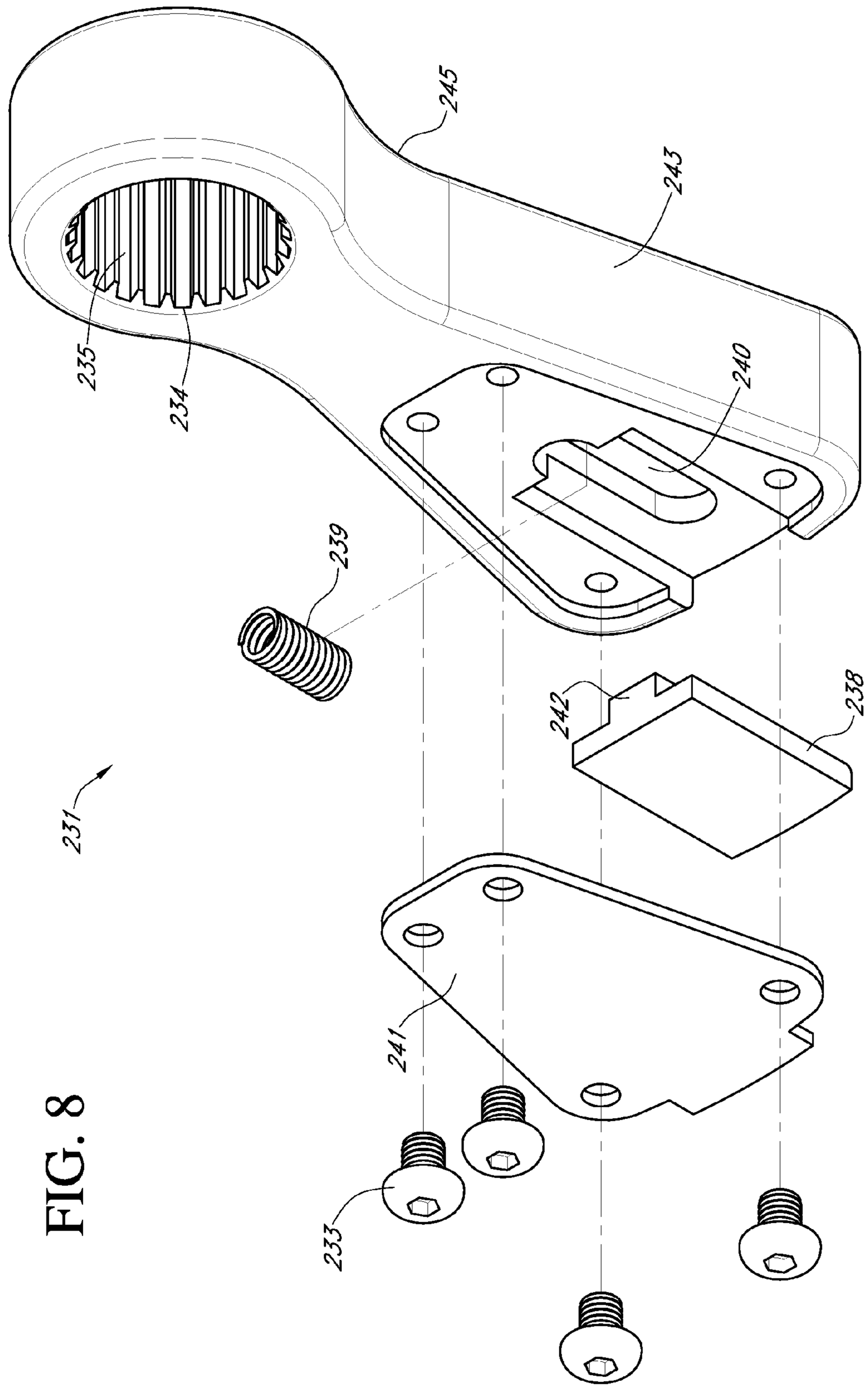

FIG. 8

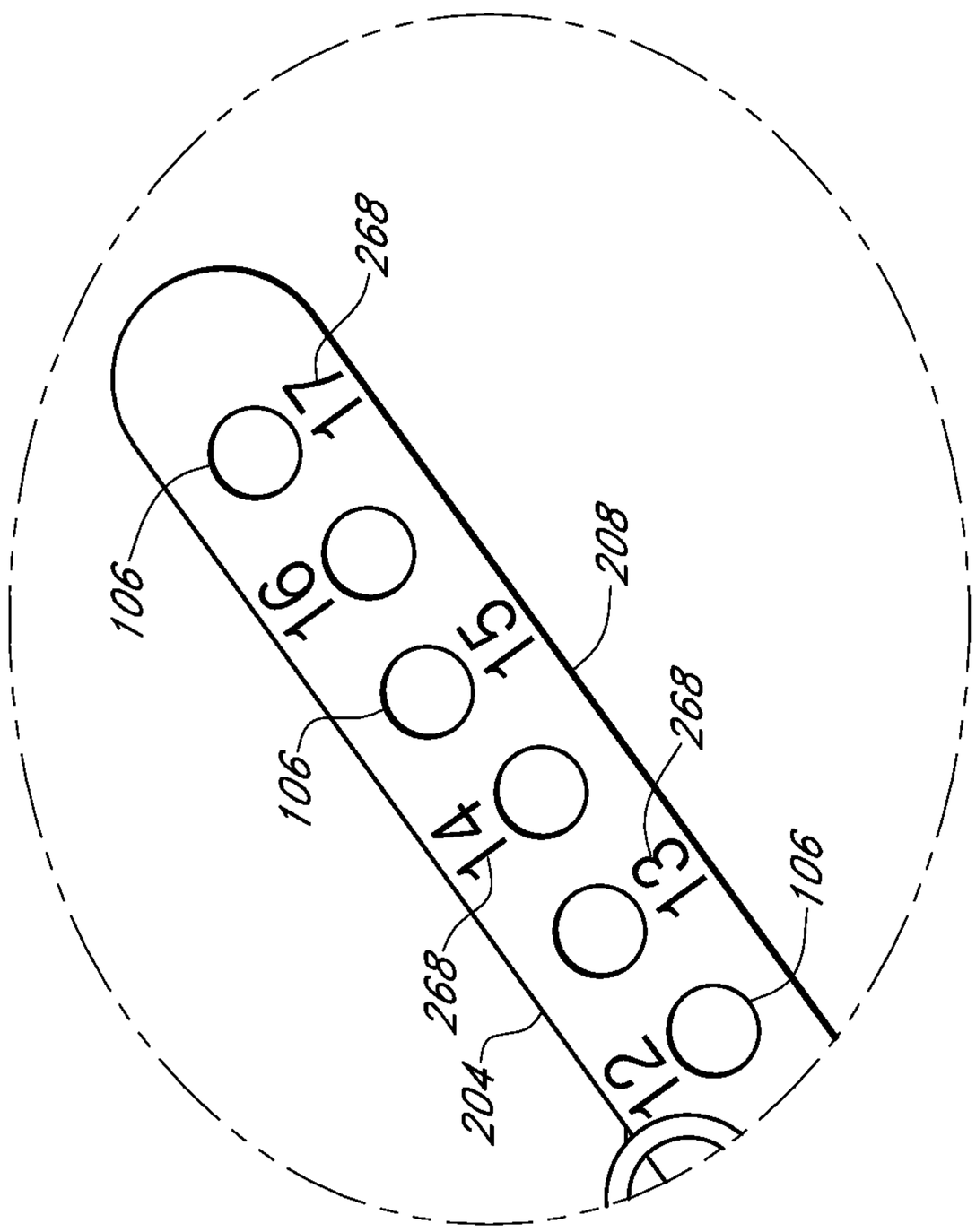

FIG. 9

290

294 Jack Stand Setting	291 Beam Bracket Setting	292 Limb Deflector Bracket Setting	293 Link Member Hole #
Bow Model 1	23	P	10
Bow Model 2	25	F	12
Bow Model 3	31	N	15
C			
D			
G			

FIG. 10

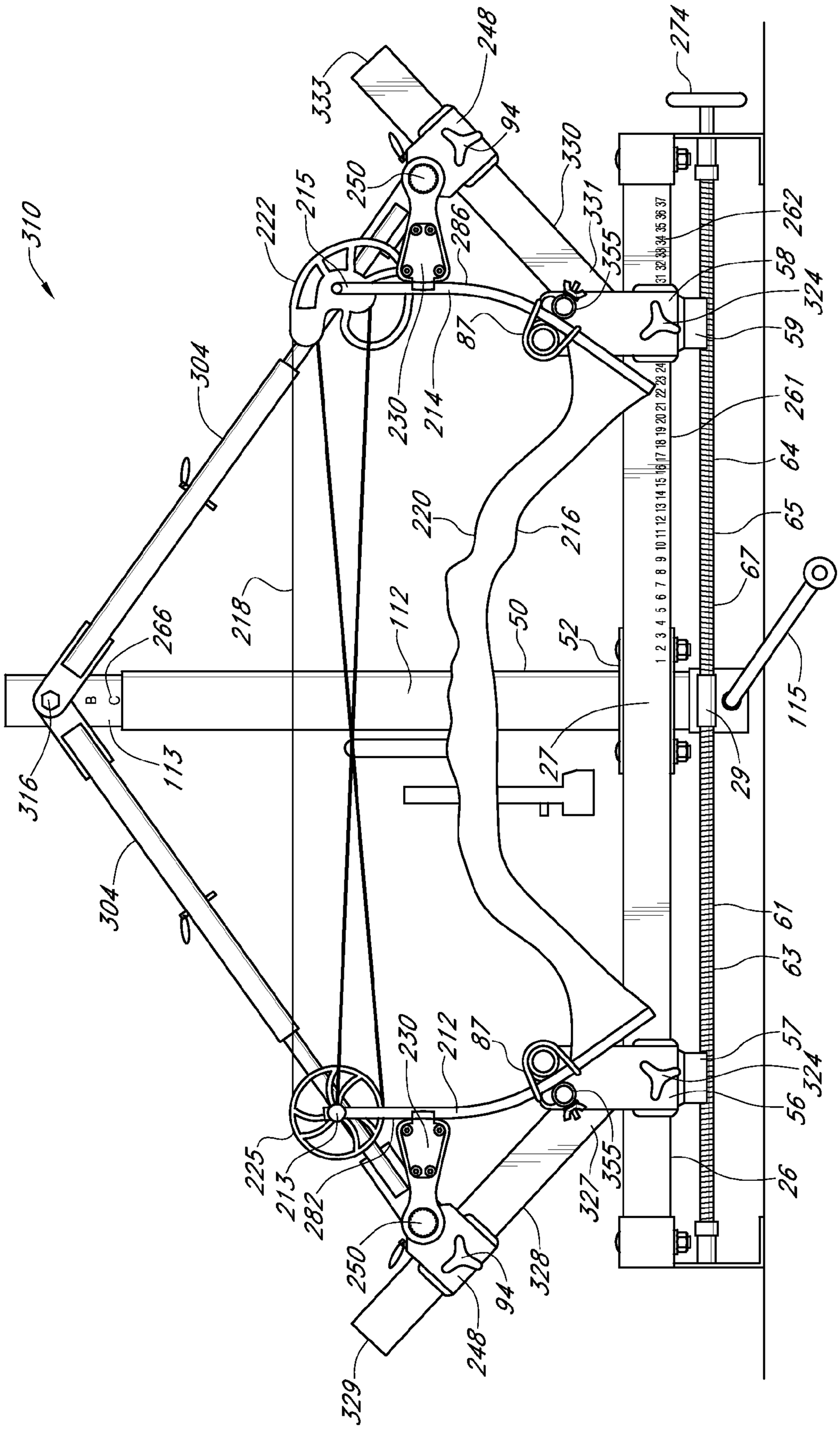
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FIG. 11

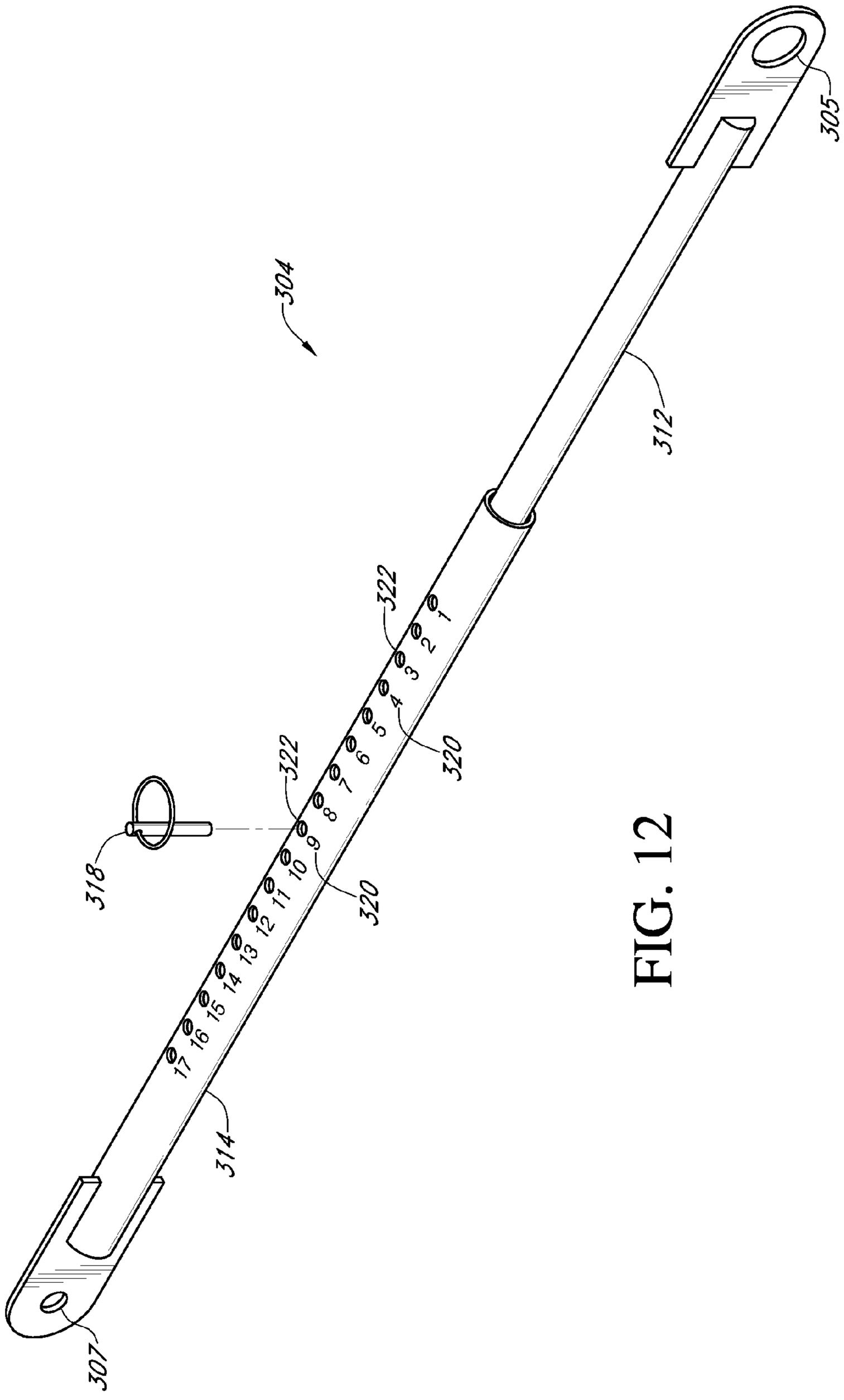


FIG. 12

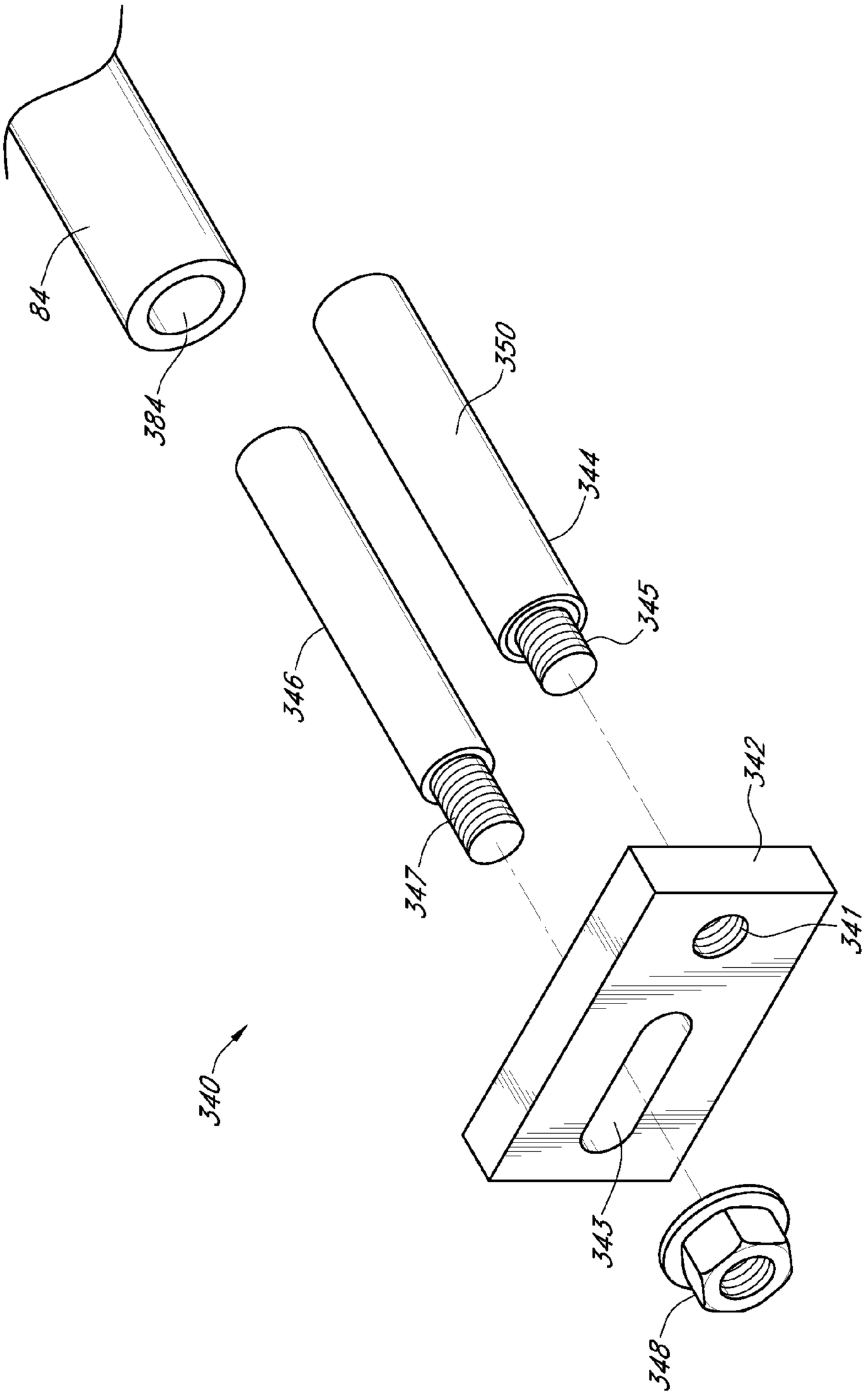


FIG. 13

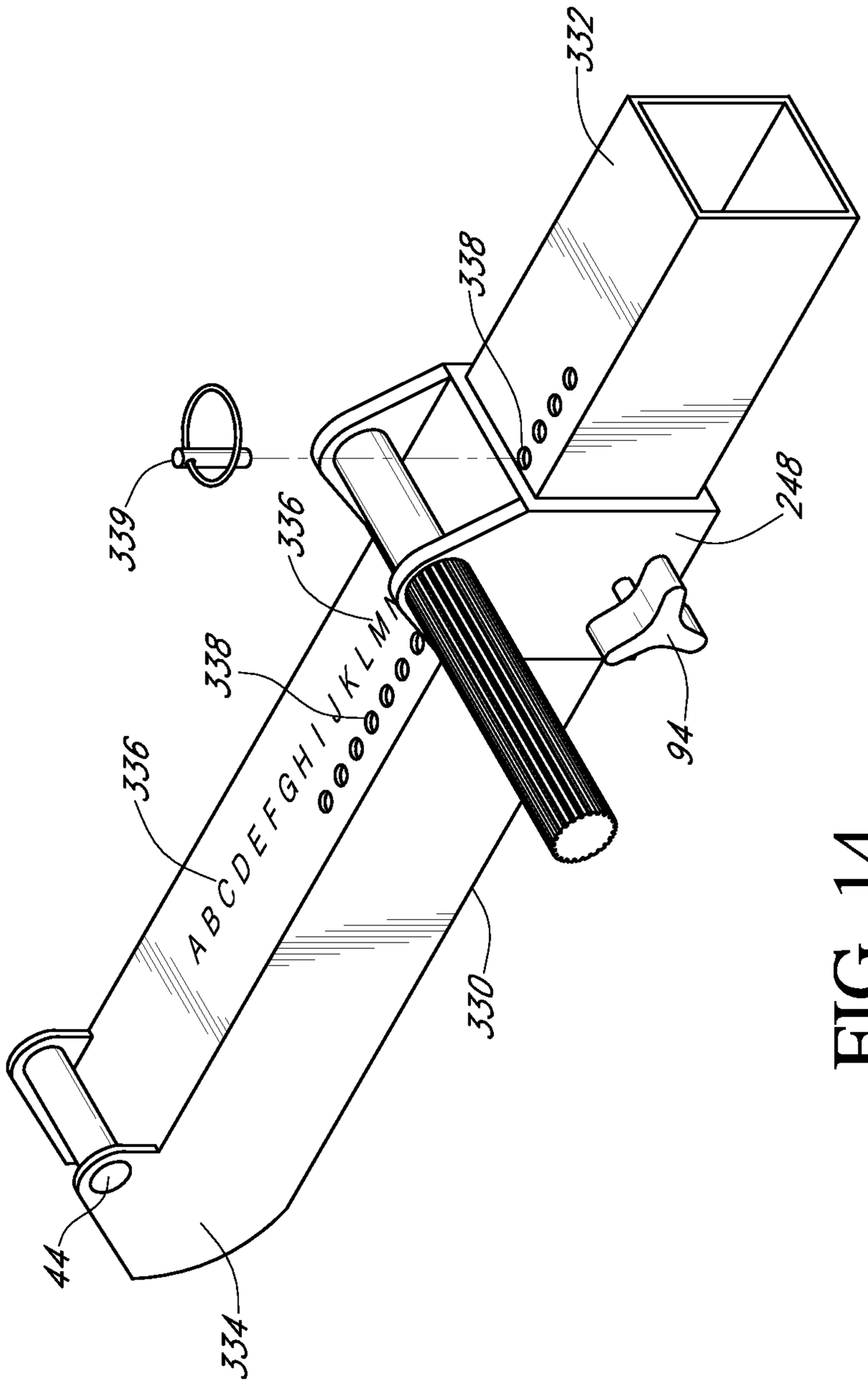
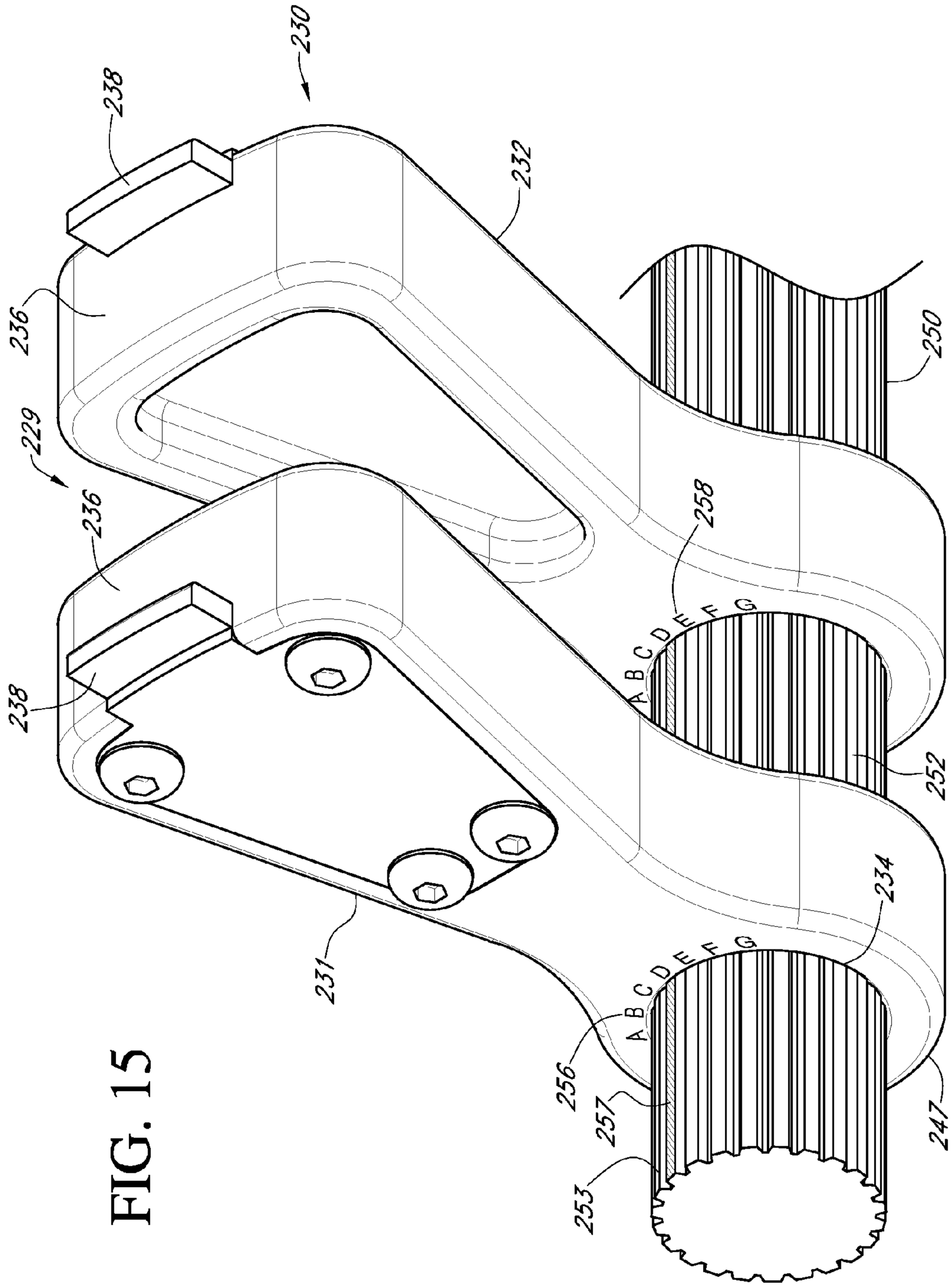


FIG. 14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A B C D E F G
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FIG. 15

356

Bow Model	Jack Stand Setting	Bracket Setting Along Beam	Pivot Arm Bracket Location	Limb Block Orientation	Link Length Setting
Bow Model 1	C	23	N	B	11
Bow Model 2	D	25	P	C	13
Bow Model 3	G	31	R	D	16

358 360 362 364 366 368

FIG. 16

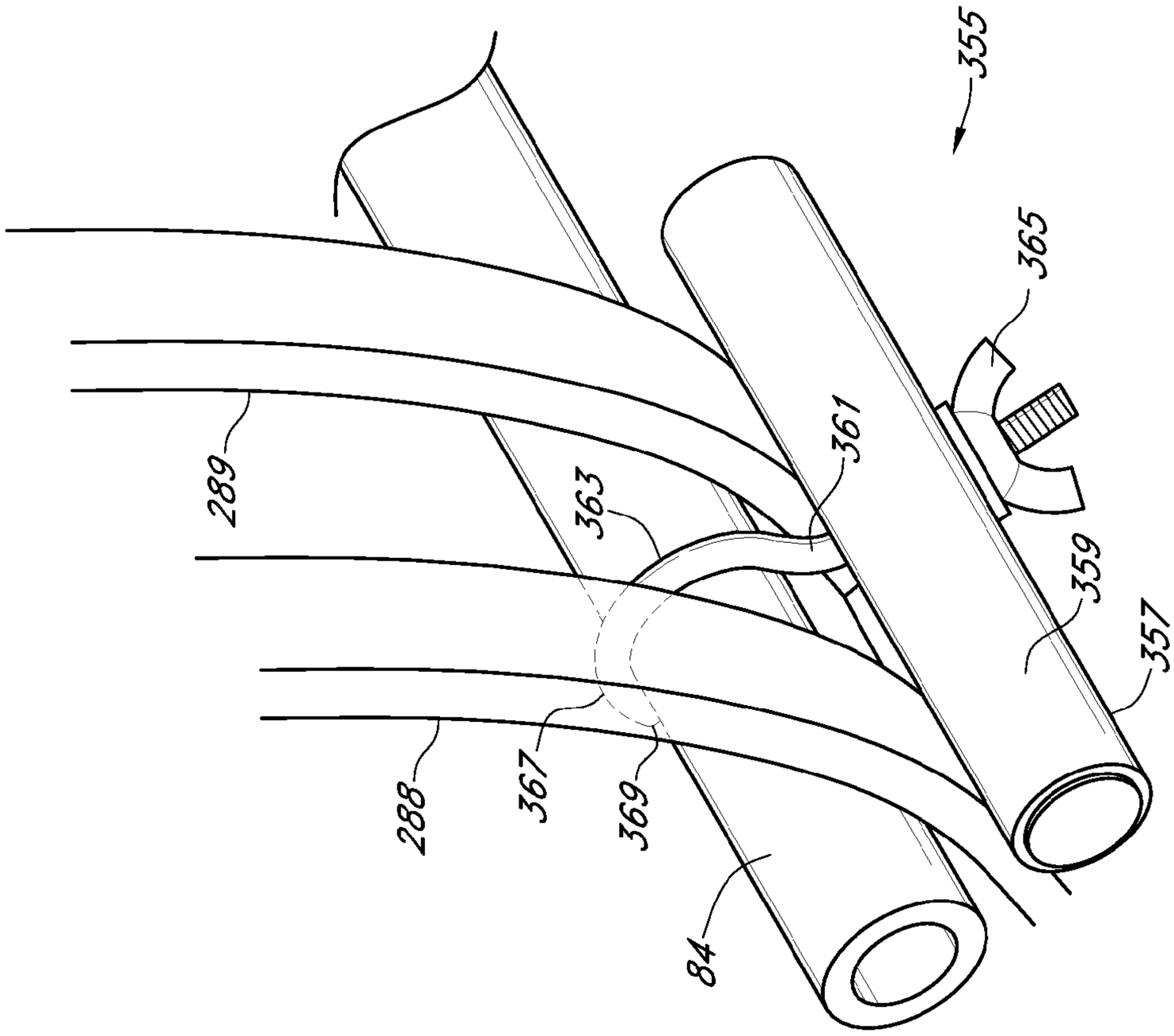

FIG. 17

BOW PRESS WITH ENHANCED SAFETY FEATURES

CROSS REFERENCE

This application claims priority from U.S. patent application Ser. No. 12/652,086 filed Jan. 5, 2010 and U.S. patent application. Ser. No. 13/100,575 filed May 4, 2011, which applications are hereby incorporated by reference.

BACKGROUND

The present invention relates to bow presses for maintenance of compound archery bows.

A typical compound archery bow includes a pulley at one end and an eccentric cam at the opposite end around which the cable of the bowstring is passed. The stringing or tuning of a compound bow, with its eccentrically mounted cam and its pulley, tension cable and bow string, is critical to achieve a proper balance of the eccentrically mounted pulleys or cams. The complexity of the stringing and the sensitivity to proper tuning of the bow, makes it very difficult to string and tune a compound bow without the aid of a bow press.

Periodic retuning of compound bows is often required to maintain desired performance levels. For retuning and to change, replace or repair components of the compound bow, such as the bowstring, string sights, dampers, the tension cable, the cams and other components, a bow press is required.

Through the years a number of bow presses have been developed for facilitating stringing and maintenance of compound bows. In general, these presses have included a stationary base having a pair of spaced apart inside surface supports, in the form of pegs or rollers, for contacting the inside of the bow, and a pair of limb supports, in the form of pegs or rollers, attached to a movable mechanism for applying a bending force to the limbs of the bow. Such a bow press is described in Gibbs, U.S. Pat. No. 6,968,824.

It is very important that the inside surface support and the limb supports of the bow press be precisely positioned in such a manner that the bow is properly loaded into the press in a manner that when the limbs are bent, the forces will not overstress or otherwise damage the bow. Because compound bows vary dimensionally, particularly in riser length, it is necessary that the inside surface support and the limb supports on the bow press be adjustable. In the past, it has been customary to provide incremental holes in the bow press so that the position of the inside surface support and the limb supports could be moved to achieve a satisfactory fit with regard to a given bow. The incremental nature of this adjustment approach often results in a fit of the bow press to the bow which is not quite ideal, and can result in damage to the bow. In the patent to Gibbs, U.S. Pat. No. 6,968,834, an improvement is made to allow manually adjustable sliding clamps which are selectively moveable along a beam and when located properly, may be clamped to the beam by tightening bolts or set screws.

As archery technology has progressed, compound bows have been developed which include much shorter limbs than earlier compound bows, with the short limbs designed to join the bow riser at a substantial angle approaching a perpendicular, and hence the limbs sweep back toward the user. These swept back limb bows are frequently termed "parallel" limb bows or "short limb" bows. Pressing of such bows in the prior art bow presses has proved to be challenging.

Certain deficiencies in the bow press disclosed in Gibbs, U.S. Pat. No. 6,968,834 have been identified, especially when

such, a bow press is used with short limb bows. First, the adjustability of the link members which connect the pivot arms to the jack is challenging to accomplish by a lone user because the user must employ one hand to lift one pivot arm so that the limb engaging member abuts the limb while at the same time attaching the link member to the jack and when the link member to attached is the second, matching the link member's effective length to the other link member. Then, if a user forgets to place the spring clip to retain the link members to the jack, the link members may slide off the pin on the jack when compression is applied to the bow, causing a potentially injurious condition.

Additionally, with a bow press such as disclosed in Gibbs, U.S. Pat. No. 6,968,834, retention of the limb deflecting brackets along the pivot arms by friction, through use of a set screw, requires excessive effort to adequately secure the bracket in place along the pivot arm.

A conventional bow press must be adjusted each time the press is to be used, to adjust the press for the particular bow to be pressed, until the adjustable elements of the press are matched to the particular bow. This is usually accomplished through time consuming experimentation.

Finally, when pressing a parallel or other short limb bow with a conventional bow press, it is possible to compress the limbs toward one another to the point where the bow may spring out of the bow press, escaping containment and creating a dangerous condition.

These safety and efficiency deficiencies deserve remediation.

It is desirable, therefore, to provide an improved bow press apparatus which overcomes problems and shortcomings of prior art bow presses, and allows safe compression of a short limb bow.

SUMMARY OF THE INVENTION

The present invention provides an improved archery bow press used to relieve tension in the bow string of a compound archery bow so that maintenance and repair of the bow string and its components may be safely and easily accomplished. The invention also describes a method for setting a bow press in advance of attaching the bow, by reference to a table of compiled data correlated to a list of differing makes and models of bows which may be compressed on the bow press.

The archery bow press provides a support base supporting an elongate beam oriented horizontally. An upright screw jack is located midway along the beam and is retained to the beam. An elongate threaded rod is mounted to the base adjacent and parallel to the elongate beam. The threaded rod is supported at each opposing end and the rod is also supported in a central housing where the rod contains no threads. The first half of the rod is threaded with right hand threads and the second half of the rod is threaded with left hand threads. A pair of pivot arm bracket members is slidable along the beam with one bracket member on each opposing side of the midpoint of the beam. The pivot arm bracket members are coupled to the threads of the threaded rod such that rotation of the rod will cause the pivot arm bracket members to be drawn together or moved apart depending on the direction of rotation of the threaded rod. A hand drivable member coupled to one end of the threaded rod permits convenient rotation of the threaded rod in the desired direction. The hand drivable member may be a coaxial hand wheel joined coaxially to one end of the threaded rod, or it may be a right hand gear box which permits a crank to turn the threaded rod. Pivot arms are hinged to each of the pivot arm bracket members and each pivot arm has a limb support bracket member selectively slidable along

its length. An elongate link member is hinged to each of the limb support bracket members with each of the link members also retained to the screw jack which is retained to the mid-point of the beam. The elongate link members are adjustable in length. A laterally extending cushioned riser support rod is mounted to each pivot arm bracket such that a bow can be suspended under the laterally extending riser support rods by elastomeric bands. The pivot arm brackets are caused to move along the beam by use of the hand drivable member which rotates the elongate threaded rod, so that the riser support rods can be located below the each limb where it joins to the bow riser at the limb pocket.

A splined rod extends perpendicularly from each limb support bracket member, the splined rod being non-rotatable upon the limb support bracket member. A pair of spaced apart limb engagement blocks is received on the splined rod. The limb engagement blocks are positioned such that a bearing surface of each may bear on the limb on opposing sides of the cam or pulley supported on the limb.

Optionally, when desired, a pin support bracket may be adjustably connected to each of the elongate link members. Each pin support bracket may support a horizontally projecting tapered pin having a generally conical shape and having an annular groove near the tip of the pin into which the bow string of the compound bow may be temporarily placed during repair and maintenance of the bow string.

The present invention also provides limb safety latches which may be easily attached to the how press when the bow is in place on the bow press ready to be compressed. Each safety latch locks the limb to the bow press to prevent the bow from escaping downward from the bow press when the bow is compressed, especially when the bow is of the parallel limb variety, wherein the limbs of the bow extend from opposing ends of the riser of the bow at substantial angles, that is, by at least seventy-five degrees from the longitudinal axis of the riser.

Two embodiments are described. In a preferred embodiment particularly for use with a split limb bow, limb latching members can be added to the bow press when the bow is in place ready to be compressed. Each limb latching member locks the bow to the press by securely retaining each split limb element to the riser support rod which it abuts. Each limb latching member has a curved hook which extends over the riser support rod and connects with a transverse bar which sits below the split limb and extends across it, the shank of the hook passing between the split limb elements of the split limb.

In a second embodiment for bows which are equipped with either solid limbs or split limbs, the limbs may be retained to the bow press by temporary attachment of limb retainers to the riser support rods on each side of the bow press. This second embodiment includes first and second parallel pins, the spacing between them being adjustable. The pins are mounted to a plate element which includes a slotted opening such that one pin may be slid along the slotted opening and then locked in place. The other pin is fixed to the plate element.

Each inside surface support rod is provided with a coaxial opening into which one of the pins of the limb retainer may be inserted. The other pin is placed below the respective limb which is abutted to the inside surface support rod and the pins are brought together before compression begins and the moveable pin is tightened to the plate element when the second pin is touching the exterior surface of the limb member. The limb retainer locks the limb to the inside surface support rod and prevents the limb from escaping the bow press even if the elastic bands which suspend the bow from the inside surface support rods are overpowered.

In one use of the archery bow press, with the limbs of the bow urged toward each other to reduce tension on the bow string, a cable section of the bow string may be detached from the bow and attached to one of the tapered pins, whereupon the screw jack may be lowered to relieve deflection of the limbs relative to the riser. A flexible strap may be employed to temporarily connect a segment of the bow string to the bow riser in order to place tension on the bow string. With this application, the cable section attached to a pin may then be refurbished, e.g., reserved.

Because of the inclusion of a user drivable member at an end of the threaded rod, a user need not move from a position near the riser of a bow in the bow press while adjusting the separation of the pivot arm bracket members along the beam because when the spacing between the pivot arm brackets is being selected, it is to conform the distance between the riser support rods which are to engage the inner face of the bow so that the those riser support rods are spaced just outboard of the connection of the bow limbs to the bow riser at the limb pocket.

Markings or scale indications are provided along the front face of the elongate beam so that the location of the right hand pivot arm bracket can be preset along the beam, with the left hand pivot arm bracket thereby also being preset along the beam because they are coupled through connections with the threaded rod. In the preferred embodiment of the present invention, markings are provided along each pivot arm so that the limb deflector bracket movable along the pivot arm can be moved to a predetermined location and a lock pin dropped through the limb deflector bracket into a selected hole along the pivot arm, thereby locking the limb deflector bracket securely into place along the pivot arm on which it is supported.

Furthermore, in the preferred embodiment, link members which couple the pivot arms to the jack are telescopically adjustable in length and may be adjusted without detaching either end of the link member. The link members are marked with numbers or letters or other markers which indicate the extension of the link members. Drop in pins are used to lock the lengths of the link members before the jack is extended. The ends of the link members need not be removed from their locations on the press to effectuate adjustment of their effective lengths. Therefore, the opportunity for error in use of the press is reduced since the user need not remove the upper ends of the link members to reposition them to the jack and possibly fail to properly latch the links to the jack.

Additionally, scale markings are provided along the extendible section of the jack so the appropriate extension of the extendible section can be selected for pressing of the bow, once the bow is secured in the bow press and after other adjustments have been made.

A compilation of data in the form of a data table is supplied with the bow press, the data table including data which correlates a given type or make of bow with the placement of the adjustable members when the bow press is being prepared to compress a particular bow. Thus, the user is enabled to preset the bow press for his or her particular bow without having to adjust the press while the bow is suspended from the riser support rods. In addition, the user may either preset the bow press for maintenance of the bow string, or preset the bow press for complete disassembly of the bow, such as when removal of the limbs is desired. In the case of use of the bow press in a bow repair facility, the press operator will consult the data table to locate the settings of the bow press for a particular bow to be serviced, presetting the jack extensible member, locating the pivot arm brackets along the main beam, locating the limb engagement brackets along the pivot

arms, setting the starting extension of the link members, and placing the limb engagement blocks at a proper rotational orientation.

A primary object of the invention is to provide an archery bow press that is easy and safe to use. The objective of improved safety is provided by the telescoping links and the limb retainers which lock a short limbed bow to the bow press. Elimination of a need to detach the link members from the jack prevents accidental failure to install a locking member to retain each limb member to the jack.

It is a further object of the invention to provide an improved bow press for short limbed bows which allows safe and secure compression of a short limbed bow and which protects the bow from damage during compression.

Another important objective of the invention is to provide a method to preset a bow press depending on the particular compound bow to be compressed, by reference to a compilation of data in a data table which correlates the starting positions of the adjustable parts of the bow press to the make or model of bow to be pressed.

Further objects of the invention are: to provide a how press which features markings on the adjustment parts thereof which permits set up of the press depending on the brand and model of compound bow to be compressed in the bow press.

These and other objects of the invention will be understood from the detailed description of the invention which follows.

BRIEF DESCRIPTION OF THE DRAWING FIGURES

FIG. **1** is a front elevation of an archery bow press with a compound bow installed on the bow press of the invention.

FIG. **2** is a side plan view of the archery bow press of FIG. **1**.

FIG. **3** is a front elevation of the archery bow press of FIG. **1** with a compound bow installed thereon and with one end of the bow string cable disconnected from one limb of the bow and secured to an element of the bow press.

FIG. **4** is a front elevation of a second exemplary archery bow press for a short limbed bow according to the present invention.

FIG. **5** is an enlarged view of the section of FIG. **4** marked as item **5**.

FIG. **6** is a side plan view of the bow press of FIG. **4**.

FIG. **7** is an enlarged perspective of the limb engaging cradle of the bow press of FIG. **4**.

FIG. **8** is an exploded perspective of one of the limb engaging members of the cradle of FIG. **7**.

FIG. **9** is an enlarged front elevation of an end of one of the limb members of the bow press invention.

FIG. **10** is an exemplary table of bow press member settings cross referenced to bow models.

FIG. **11** is a front elevation of an improved bow press according to the present invention.

FIG. **12** is an enlarged perspective of one of the telescoping link members of the bow press of FIG. **11**.

FIG. **13** is an exploded view in perspective of one embodiment of a limb retention member of the present invention.

FIG. **14** is an enlarged perspective of a right-hand one of the pivot arms of the present invention, with a pivot arm bracket is place along the pivot arm.

FIG. **15** is an enlarged perspective of the preferred embodiment of the limb cradles of the present invention, showing the indexes on the limb engagement blocks and the index spline on the splined support rod.

FIG. **16** is an exemplary table showing the settings for adjustable members of the bow press correlated with various makes and models of short-limbed bows that may be compressed in the bow press of the present invention.

FIG. **17** is an enlarged perspective of a second limb retention element particularly useful when a split limb bow is to be compressed in the bow press.

DETAILED DESCRIPTION

Throughout this disclosure, identical parts are identified by the same reference numerals.

FIGS. **1-3** illustrate an embodiment of an archery bow press **10** for deflecting the limbs **12**, **14** of an archery bow **16** relative to the riser **20** thereof, to allow installation, replacement, repair or adjustment of a bow string **18** of the bow **1.6**. The bow **16** includes a riser **20** from which limbs **12**, **14** extend from opposing ends thereof. The bow **16** includes a pulley **25** at the distal end of limb **12** and a cam **22** at the distal end **15** of the limb **14**.

Bow press **10** includes an elongate main beam **26**, first and second pivot arms **28**, **30**, and pivot arm brackets **56**, **58** which retain the first and second pivot arms **28**, **30** to the main beam **26**. First and second pivot arms **28**, **30** are adapted for urging the limbs **12**, **14** toward each other to relieve tension on the bow string **18**.

The first and second pivot arms **28**, **30** are spaced from one another along the main beam **26**, with each of the first and second pivot arms **28**, **30** having a hinged end **38** and a distal end **40**. The pivot arm brackets **56**, **58** are slidingly retained to the main beam **26**.

The hinged end **38** of each pivot arm **28**, **30** is attached by pivot arm bracket **56**, **58** to the main beam **26**, for pivoting motion about pivot axles **42**, **44** which retain pivot arms **28**, **30** to pivot arm brackets **56**, **58**, such that pivot arms **28**, **30** move in a common plane with main beam **26**.

An upstanding screw jack **50** is mounted to main beam **26** by mounting assembly **52** and extends upward perpendicularly from the main beam **26** at its midpoint **27**.

An adjustment rod **64** is interconnected with each pivot arm bracket **56**, **58** by screw followers **57**, **59** such that simultaneous selective sliding movement of the first and second pivot arm brackets **28**, **30** may be effected along the main beam **26**, toward or away from the midpoint **27** of beam **26**.

The adjustment rod **64** is retained to the main beam **26** by central bracket **29** which allows adjustment rod **64** to turn freely. Adjustment rod **64** is provided with screw threads therealong with the pitch of the threads **61** of the left end **63** reversed to the pitch of the threads of the right end **65**, that is threads **61** may be right hand threads and threads **67** may be left hand threads, or vice versa. Adjustment rod **64** is operatively connected to the first and second pivot arm brackets **56**, **58** such that both pivot arm brackets **56**, **58** move at the same rates of travel along the main beam **26** though in opposing directions.

The exemplary embodiment of the bow press **10** of FIGS. **1-3** includes a first inside surface support **78**, adapted for contacting an inside surface **80** of first limb **12** near its connection to the riser **20**. The invention allows the first inside surface support **78** to be placed as close as possible to the connection of the first limb **12** to the riser **20**, so that the bow **16** can bend in the bow press **10** about the interconnection of the first limb **12** and the riser **20**. Similarly second inside surface support **84** contacts inside surface **86** of limb **14** near its connection to riser **20**. Preferably inside surface supports **78**, **84** are cushioned cylindrical rods. Elastic bands **87** selectively are applied to bow **16** to retain bow **16** to inside surface supports **78**, **84**.

The first inside surface support **78** is attached to the first pivot arm bracket **56** so that its axis is at a short fixed distance inboard of the first pivot axle **42**, with respect to the midpoint **27** of beam **26**. This closely adjacent but slightly inboard positioning of the first inside surface support **78** with respect to the pivot axle **42** of the first pivot arm **28**, together with having both the first inside surface support **78** and first pivot axle **42** located at a fixed distance from one another on the first pivot arm support bracket **56**, provides an advantageous arrangement for properly supporting the inside surface **80** of the bow **16** in a manner that allows the first limb **12** to flex during use of the bow press **10** in a manner that is very similar to the way the first limb **12** flexes when the bow **16** is in normal use.

The second inside surface support **84** is attached to the second pivot arm bracket **58** so that the axis of second inside surface support **84** is a short fixed distance inboard of the second pivot axle **44**, with respect to the midpoint **27** of beam **26**. This closely adjacent but slightly inboard positioning of the second inside surface support **84**, with respect to the pivot axle **44** of the second pivot arm **30**, together with having both the second inside surface support **84** and second pivot axle **44** located at a fixed distance from one another on the second pivot arm bracket **58**, provides an advantageous arrangement for properly supporting the inside surface **86** of the limb **14** in a manner that allows the second limb **14** to flex during use of the bow press **10**.

The bow press **10** further includes a first limb deflector bracket **88** slidingly attached to the first pivot arm **28**, with a first limb engaging arm **90** extending laterally from the first limb deflector bracket **88**. The first limb engaging arm **90** is adapted for contacting an outside surface **97** of the first limb **12** at a point along the first limb **12** displaced from its connection to riser **20**. The first limb deflector bracket **88** includes a locking mechanism **94** for locking the first limb deflector bracket **88** to the first pivot arm **28** at a selected location with respect to the first pivot axle **42**.

In similar fashion, a second limb deflector bracket **96** is slidingly attached to the second pivot arm **30** and includes a second limb engaging arm **92** extending laterally and perpendicularly from the second limb support bracket **96**, with the second limb engaging arm **92** contacting an outside surface **99** of the second limb **14** at a point along the second limb **14** spaced away from riser **20**. The second limb deflector bracket **96** includes a locking device **102** such as a locking screw which selectively locks the second limb deflector bracket **96** against movement along the second pivot arm **30** at a selected location with respect to the second pivot axle **44**. Limb engaging arms **90**, **92** are relatively short but preferably extend perpendicularly from each of pivot arms **28**, **30**.

The bow press **10** further includes a screw jack **50** substantially centered on beam **26**, as well as a first link **108** and a second link **110**. The screw jack **50** has a stationary base section **112** attached to the main beam **26** of the bow press **10** by jack mounting brackets **52**. The screw jack **50** further includes an extensible section **113** telescoping from base section **112** of the screw jack **50**. The screw jack **50** is attached to the main beam **26** at its midpoint **27** in such a manner that when first screw crank **115** is turned, the extensible section **113** of the screw jack **50** extends or retracts from base section **112**.

The first and second links **108**, **110** each have a first end **109**, **111** pivotably attached respectively to the first and second limb engaging arms **90**, **92**, so that each pivots freely with respect to pivot arms **28**, **30**. The first and second links **108**, **110** cross and are each removably joined to the other by a pin **116** mounted to and extending perpendicularly from the extensible section **113** of the screw jack **50**.

The first and second links **108**, **110** have equal lengths between their respective first ends **109**, **111**, and the common connection provided by the pin **116**. The screw jack **50** functions to raise and lower both pivot arms **28**, **30** together thereby exerting lifting force to limb engaging arms **90**, **92** and hence applying bending force to the limbs **12**, **14** of bow **16** mounted in the bow press **10**.

Each of first and second links **108**, **110** includes a pin support bracket **120**, **121** which may be selectively slidable along the respective link **108**, **110**. Adjustment of pin support brackets **120** along links **108**, **110** is accomplished by loosening lock screws **128** of each pin support bracket **120**, **121**. Each pin support bracket **120**, **121** includes a protrusion, preferably a cylindrical pin **122**, extending horizontally therefrom generally perpendicular to links **108**, **110** and extending over bow **16**. From FIG. **2** it can be seen that cylindrical pins **122** are preferably tapered and each includes a groove **124** near its free end **126**. The grooves **124** are selected to receive the bow string **18** when deflected from its ordinary use position. The length of pins **122** and placement of grooves **124** on each pin **122** are selected such that they preferably lie outside the plane defined by the centerline of the bow riser **20** and the beam **26**. Therefore, with the tension on bow string **18** relaxed by flexing of limbs **12**, **14**, the nock portion **17** of the bow string **18** may be displaced from the cable sections **19**, **21** of the bow string **18**. Then the extensible section **113** of screw jack **50** may be lowered, returning tension to bow string **18**. Replacement of worn or broken serving wrapped around nock portion **17** may be easily accomplished when the nock portion **17** is pulled upward and placed on grooves **124** of pins **122**. Pins **122** serve to laterally and vertically separate nock portion **17** from the remainder of bow string **18**.

First end **140** of adjustment rod **64** is coupled to a gear box **142** adapted to allow adjustment rod **64** to be rotated from a perpendicular direction. Specifically gear box **142** houses a spider gear which allows a second crank **118** to apply rotational force to crank coupling **144** of gear box **142** with the result that adjustment rod **64** rotates. As adjustment rod **64** rotates, threaded couplers within each of screw followers **57**, **59** are driven by opposing threads **61**, **67** causing pivot arm brackets **56**, **58** to converge or diverge at equal rates. Thus pivot arms **28**, **30** are symmetrically adjusted to accommodate the length of a bow **16** to be pressed. Because the bow **16** to be pressed in bow press **10** must be supported by the user as the pivot arms **28**, **30** are moved, having a crank coupling **144** facing the holder of the bow **16** eases the chore of adjusting the bow press **10** to fit the bow **16** such that inside surface supports **78**, **84** are positioned just outboard of the limb connections of limbs **12**, **14** to riser **20**. Then elastic straps **87** can be applied to suspend bow **16** from inside surface supports **78**, **84**.

Importantly, gear box **142** at first end **140** of adjustment rod **64** permits rotation of adjustment rod **64** by a user using second crank **118** to rotate the crank coupler **144** while standing in front of bow press **10** and holding bow **16**. This allows the user to easily reposition the pivot arm brackets **56**, **58** while suspending the bow **16** with one hand until the separation of pivot arm brackets **56**, **58** is appropriate so the bow limbs **12** and **14** are supported properly.

FIG. **3** illustrates the bow press **10** in use to support bow **16** while cam end **131** of cable portion **21** of bow string **18** is repaired. With bow **16** placed onto bow press **10** with extensible section **113** retracted into stationary section **112** of screw jack **50** such that limb engaging arms **90**, **92** do not touch limbs **12**, **14**, and with bow string **18** attached to bow **16**

in condition for use, extensible section **113** may be raised thereby flexing limbs **12**, **14** toward screw jack **50**. Deflection of limbs **12**, **14** toward each other relaxes tension on bow string **18** and permits detachment of first cam end **131** of cable portion **21** of bow string **18** from cam **22**. Cable portion **21** can then be passed around tapered pin **122** of second pin support bracket **121** and attached to pin **122** of first pin support bracket **120** which is attached to first link **108**. A variable length strap **160** may be placed around both cable portion **21** and riser **20** to retain cable portion **21** to riser **20**. Thereafter, extensible section **113** of screw jack **50** is lowered, returning tension to bow string **18**. By careful attention to the preservation of twist in bow string **18** when it is detached from cam **22** and hooked to pin **122** of first pin support bracket **120**, the tuning of bow string **18** can be preserved while repair to serving wound around cable portion **21** is accomplished. Once repair has been completed, such as by replacement of serving around the end section **23** of cable portion **21**, extensible section **113** can again be extended thereby pressing limbs **12**, **14** toward each other and detensioning bow string **18**. This permits easy and safe removal of strap **160** and reattachment of cam end **131** to cam **22** while tuning of bow string **18** is maintained as previously set.

When the bow press **10** is to be used, the position of the inside surface supports **78**, **84** and limb engaging arms **90**, **92** are adjusted to fit the bow **16**. First crank **115** is applied to screw jack **50** to retract the extensible section **113** of the screw jack **50** to an initial position where the bow **16** can be inserted without resistance into the press **10** with the inside surface supports **78**, **84** generally on the inside of the bow **16** and closely adjacent the attachments of the first and second limbs **12**, **14** to the riser **20**. Adjustment of the spacing of pivot arm brackets **56**, **58** is accomplished by turning adjustment rod **64** with second crank **118**. The limbs **12**, **14** will be inboard of the first and second limb engaging arms **90**, **92**.

The connection point between the first and second links **108**, **110** may also be adjusted if necessary by repositioning pin **116** in different holes in links **108**, **110** to allow placement of the bow **16** into the bow press **10**. Adjacent holes in the links **108**, **110** are laterally offset from one another to aid in visually connecting the links **108**, **110** to the pin **116** in such a manner that the links **108**, **110** have equal lengths between their respective first ends at the first and second limb engaging arms **90**, **92**, and the common connection provided by the pin **116**.

By virtue of the construction of the bow press **10** as described above, the position of the first and second pivot arm brackets **56**, **58** along the beam **26** is easily adjustable to thereby allow for very precise and proper positioning of the location of the inside surface supports **78**, **84** to match the bow **16**. Also, by virtue of the coupling of adjustment rod **64** to pivot arm brackets **56**, **58**, as either of the first or second pivot arm brackets **56**, **58** is moved along the beam **26**, the other pivot arm bracket moves an equal distance in the opposite direction along the beam **26**, so that the first and second bow supports **78**, **84**, and the pivot pins **42**, **44** are always maintained at symmetrical locations with respect to the upstanding screw jack **50**, regardless of where either of the pivot arm brackets **56**, **58** is positioned along the beam **26**.

FIGS. **4-8** illustrate another embodiment bow press which is useful for compressing short-limb bows or bows with limbs which almost parallel each other and extend at substantial angles from the longitudinal axis of the riser. FIG. **4** illustrates the invention bow press **210** according to the invention for deflecting the relatively short limbs **212**, **214** of an archery bow **216** relative to the riser **220** thereof, to allow installation, replacement, repair or adjustment of a bow string **218** of the bow **216**. The bow **216** includes a riser **220** from which limbs **212**, **214** extend at substantial angles from the longitudinal axis of riser **220**. The bow **216** includes a pulley **775** at the distal end **213** of limb **212** and a cam **222** at the distal end **215** of the limb **214**.

Bow press **210** includes many identical parts to the bow press **10** of FIGS. **1-3** including an elongate main beam **26**, first and second pivot arms **28**, **30**, and pivot arm brackets **56**, **58** which retain the first and second pivot arms **28**, **30** to the main beam **26**. First and second pivot arms **28**, **30** are adapted for supporting limb cradles **230** which may urge the limbs **212**, **214** toward each other to relieve tension on the bow string **218**.

The first and second pivot arms **28**, **30** are spaced from one another along the main beam **26**, with each of the first and second pivot arms **28**, **30** having a hinged end **38** and a distal end **40**. The pivot arm brackets **56**, **58** are slidingly retained to the main beam **26**.

The hinged end **38** of each pivot arm **28**, **30** is attached by pivot arm bracket **56**, **58** to the main beam **26**, for pivoting motion about pivot axles **42**, **44** which retain pivot arms **28**, **30** to pivot arm bracket **56**, **58**, such that pivot arms **28**, **30** move in a common plane with main beam **26**.

An upstanding screw jack **50** is mounted to main beam **26** by mounting assembly **52** and extends upward perpendicularly from the main beam **26** at its midpoint **27**.

An adjustment rod **64** generally parallel to main beam **26** is interconnected with each pivot arm bracket **56**, **58** by screw followers **57**, **59** such that simultaneous selective sliding movement of the first and second pivot arm brackets **28**, **30** may be effected along the main beam **26**, toward or away from the midpoint **27** of beam **26**.

The adjustment rod **64** is retained to the main beam **26** by central bracket **29** which allows adjustment rod **64** to turn freely. Adjustment rod **64** is provided with screw threads therealong with the pitch of the threads **61** of the left end **63** reversed to the pitch of the threads of the right end **65**, that is threads **61** may be right hand threads and threads **67** may be left hand threads, or vice versa. Adjustment rod **64** is operatively connected to the first and second pivot arm brackets **56**, **58** such that both pivot arm brackets **56**, **58** move at the same rates of travel along the main beam **26** though in opposing directions.

Located along first end **261** of beam **26** are spaced apart indicia **262**, namely a series of numbers spaced apart evenly to mark locations along first end **261** of beam **26**. Indicia **262** provide locations at which second pivot arm bracket **58** may be set, based on data collected by using bow press **210** to press various models of compound bows. For example, a given model of a bow will have a specific known length of its riser and data may be determined regarding the proper placement of second pivot arm bracket **58** and consequently the placement of first pivot arm bracket **56** to properly support that bow on bow press **210**.

The embodiment of the bow press **210** of FIGS. **4-10** includes a first inside surface support **78** which may be a cushioned rod extending laterally forward from first pivot arm bracket **56**, adapted for contacting an inside surface **280** the first limb **212** near its connection to the riser **220**. The invention allows the first inside surface support **78** to be placed as close as possible to the connection of the first limb **212** to the riser **220**, so that the bow **216** can bend in the bow press **210** about the interconnection of the first limb **212** and the riser **220**. Similarly second inside surface support **84** contacts inside surface **284** of limb **214** near its connection to riser **220**. Preferably inside surface supports **78**, **84** are cushioned cylindrical rods extending laterally and perpendicular

to main beam **26**. Elastic bands **87** selectively are applied to bow **216** to retain bow **216** to inside surface supports **78**, **84** so that bow **216** remains suspended from bow press **210**.

The first inside surface support **78** is attached to the first pivot arm bracket **56** so that its axis is at a short fixed distance inboard of the first pivot axle **42**, with respect to the midpoint **27** of beam **26**. This closely adjacent but slightly inboard positioning of the first inside surface support **78** with respect to the pivot axle **42** of the first pivot arm **28**, together with having both the first inside surface support **78** and first pivot axle **42** located at a fixed distance from one another on the first pivot arm support bracket **56**, provides an advantageous arrangement for properly supporting the inside surface **280** of the bow **216** in a manner that allows the first limb **212** to flex during use of the bow press **210** in a manner that is very similar to the way the first limb **212** flexes when the bow **216** is in normal use.

The second inside surface support **84** is attached to the second pivot arm bracket **58** so that the axis of second inside surface support **84** is a short fixed distance inboard of the second pivot axle **44**, with respect to the midpoint **27** of beam **26**. This closely adjacent but slightly inboard positioning of the second inside surface support **84**, with respect to the pivot axle **44** of the second pivot arm **30**, together with having both the second inside surface support **84** and second pivot axle **44** located at a fixed distance from one another on the second pivot arm bracket **58**, provides an advantageous arrangement for properly supporting the inside surface **284** of the limb **214** in a manner that allows the second limb **214** to flex during use of the bow press **210**.

The bow press **210** further includes limb deflector bracket **248** slidingly attached to the pivot arms **28**, **30** with a non rotatable support rod **250** extending horizontally from each limb deflector bracket **248**, substantially perpendicular to main beam **26**. Each support rod **250** is adapted for receiving a limb cradle **230** on splined segment **252** of support rod **250** (See FIG. **7**) in order to allow each limb cradle **230** to contact an outside surface **282**, **286** of limbs **212**, **214**. Each limb deflector bracket **248** includes a locking mechanism **94** (a set screw) for locking the limb deflector brackets **248** to the first pivot arm **28**, **30** at a selected distance from the first pivot axles **42**, **44** respectively.

Referring additionally to FIGS. **5-8**, details of the structure and location of limb cradles **230** may be better understood. As seen in FIG. **7**, each limb cradle **230** includes a first limb engagement block **231** spaced apart from second limb engagement block **232** by a gap **229** sufficient to allow a cam **777** or pulley **225** to be received between them. The limb engagement blocks **231**, **232** are preferably used in pairs and are identical but arranged so that plungers **238** are located at the outside of the limb cradle **230**. Each limb engagement block **231**, **232** receives a splined segment **252** of a support rod **250** within a cylindrical opening **234** of the limb engagement block which is fitted with receiving splines **235** such that engagement blocks **231**, **232** may not rotate about splined segment **252** yet the pair of limb engagement blocks **231**, **232** may be removed from splined segment **252** and reinstalled thereon at a different angular position or each engagement block **231**, **232** each can be fitted on splined segment **252** at a different angular position from the other engagement block.

Preferably, engagement blocks **231**, **232** are placed on splined segments **252** such that the bearing surface **236** of each engagement block **231**, **232** tangentially touches the outside surfaces **282**, **286** respectively of limbs **212**, **214**, and such that the plunger **238** of each limb engagement block **231**, **232** is located at the opposing sides of limbs **212**, **214** to prevent the limbs **212**, **214** from sliding off bearing surfaces **236**.

FIG. **8** illustrates that plungers **238** of each engagement block **231**, **232** are biased by a spring **239** which is received in a recess **240** and that stop element **242** rides in recess **240** to prevent plunger **238** from escaping from engagement block **231**. A cover **241** is retained to body **243** of each engagement block **231**, **232** by screws **233**.

Cylindrical opening **234** of handle **245** of body **243** of each engagement block **231**, **232** is populated with receiving splines **235** which mesh with splines **253** of splined segment **252** of support rod **250**.

As seen in FIG. **5**, each pivot arm **28**, **30** carries indicators **264**, which in the example of FIG. **5**, are spaced apart letters. As with the indicia **262** of beam **26**, data may be compiled indicating the indicator **264** at which the limb deflector bracket **248** should be located for the specific bow model to be compressed.

Referring again to FIG. **4**, it is seen that the bow press **210** further includes a screw jack **50** substantially centered on beam **26**, as well as a pair of link members **204** joining limb deflection brackets **248** to extensible section **113** of screw jack **50**. The screw jack **50** has a stationary section **112** attached to the main beam **26** of the bow press **10** by jack mounting brackets **52**. Extensible section **113** telescopes from base section **112** of the screw jack **50**. The screw jack **50** is attached to the main beam **26** at its midpoint **27** in such a manner that when first screw crank **115** is turned, the extensible section **113** of the screw jack **50** extends or retracts from base section **112**.

Link members **204**, **204***a* mirror each other, each having a first end pivotably attached respectively to the support rods **250** so that each link member **204** pivots freely with respect to pivot arms **28**, **30**. The link members **204** cross and are each removably joined to the other and to the extensible section **113** by a pin **116** mounted to and extending perpendicularly from the extensible section **113** of the screw jack **50**.

From examination of FIG. **9**, it can be seen that adjustment end **208** of each link member **204**, **204***a* is provided with a multiplicity of holes **106** with each hole **106** labeled with a label **268** such that the label **268** of the hole **106** furthest from first ends **205**, **205***a* of each link member **204**, **204***a* is the same for each link member **204**, **204***a*. Therefore, the bow press **216** may be preset such that each link member **204**, is attached to extensible member **113** through a hole **106** labeled the same on each link member **204**, **204***a*.

The link members **204**, **204***a* have equal effective lengths between their respective first ends **205** and the common connection provided by the pin **116**. The screw jack **50** functions to raise and lower both pivot arms **28**, **30** together thereby exerting force to support arms **250** and limb cradles **230** and hence applying bending force to the limbs **212**, **214** of bow **216** mounted in the bow press **210**.

It is to be observed that extensible section **113** of jack **50** is marked with indexing marks **266** such that once a bow **216** is in place on the bow press **210** with extensible section **113** retracted, the user may extend the extensible section **113** to a predetermined location as viewed by inspection of the indexing marks **266** on extensible section **113**.

First end **140** of adjustment rod **64** is joined to a hand wheel **274** adapted to allow adjustment rod **64** to be rotated while the user is positioned in front of bow press **210**. As adjustment rod **64** rotates, threaded couplers within each of screw followers **57**, **59** are driven by opposing threads **61**, **67** causing pivot arm brackets **56**, **58** to converge or diverge at equal rates. Thus pivot arms **28**, **30** are symmetrically adjusted to accommo-

date the length of a bow **216** to be pressed. Because the bow **216** to be pressed in bow press **210** must be supported by the user as the pivot arms **28**, **30** are moved, having hand wheel **274** easily accessible by the holder of the bow **216** eases the chore of adjusting the bow press **210** to fit the bow **216** such that inside surface supports **78**, **84** are positioned just outboard of the limb connections of limbs **212**, **214** to riser **220**. Then elastic straps **87** can be applied to suspend bow **216** from inside surface supports **78**, **84**.

FIG. **10** illustrates a data table **276** which may be used to look up the type of compound, short limbed bow to be compressed and to preset the location of pivot arm brackets **56**, **58** along beam **26** by reference to cross referenced indicia in column **291**. First, jack **50** is adjusted by extending extensible section **113** to the height according to the setting indicated in column **294** of table **276** for the particular bow **216** to be compressed. Then location of limb deflector brackets **248** along pivot arms **28**, **30** may be preset by reference to alphabetic indicators in column **292** of table **276**. The numbered hole **106** of link members **204**, **204***a* to use to attach link members **204**, **204***a* to extensible section **113** is determined by reference to numbers in column **293** of table **276**. Then the bow **216** to be compressed may be placed on bow press **210** and retained thereto by elastic bands **87**. Proper orientation of limb cradles **230** on splined section **252** of support rods **250** is then accomplished, such that bearing surfaces **234** of engagement blocks **231**, **232** abut outside surfaces **282**, **286** of limbs **212**, **214**.

The preferred embodiment according to the present invention is illustrated in FIGS. **11-17**. Some of the parts of the preferred embodiment are common to the embodiment illustrated in FIGS. **1-3** and particularly to the embodiment illustrated in FIGS. **4-8**. References to elements of the drawings throughout the ensuing description identify identical elements with the same reference numerals as used in earlier portions of this disclosure.

The bow press **310** shown in FIGS. **11-17** is useful for compressing archery bows for removal of bowstrings and especially useful for compression of short-limbed bows or bows with limbs which extend at large angles from the longitudinal axis of the bow riser and are almost parallel with each other. The invention disclosed in FIGS. **11-17** includes certain safety and efficiency enhancements which are described in the following paragraphs.

FIG. **11** illustrates the invention bow press **310** according to the instant invention with a compound archery bow **216** installed on the bow press **310** for purposes of deflecting the relatively short limbs **212**, **214** of the bow **216** relative to the riser **220** thereof, to allow installation, replacement, repair or adjustment of a bow string **218** of the bow **216**. The bow **216** includes a riser **220** from which limbs **212**, **214** extend at substantial angles (at least seventy-five degrees) from the longitudinal axis of riser **220**. The bow **216** includes a pulley **225** at the distal end **213** of limb **212** and a cam **222** at the distal end **215** of the limb **214**.

Bow press **310** includes many identical parts to the bow press **210** of FIGS. **11-13** including an elongate main beam **26** supported on base **32**, and pivot arm brackets **56**, **58** which are moved together but in opposite directions by action of the threaded rod **64** when it is driven by hand wheel **274**. An upstanding screw jack **50** is mounted to main beam **26** by mounting assembly **52** and extends upward perpendicularly from the main beam **26** at its midpoint **27**.

Each of pivot arm brackets **56**, **58** is coupled to a pivot arm **328**, **330** respectively, the pivot arms **328**, **330** being adapted for supporting limb cradles **230** which may urge the limbs **212**, **214** toward each other to relieve tension on the bow string **218**.

The first and second pivot arm brackets **56**, **58** are slidingly retained to the main beam **26** and are spaced from one another along the main beam **26**, essentially equidistantly from midpoint **27** of beam **26**. Each of the first and second pivot arms **328**, **330** has a hinged end **327**, **331** hinged to a pivot arm bracket, **56**, **58**, and each has a distal end **329**, **333**. The hinged end **327**, **331** of each pivot arm **328**, **330** is attached by pivot arm bracket **56**, **58** to the main beam **26**, for pivoting motion about pivot axles **42**, **44** (See FIGS. **4**, **14**) which retain pivot arms **328**, **330** to pivot arm brackets **56**, **58**, such that pivot arms **328**, **330** move in a common plane with main beam **26**.

The adjustment rod **64** is generally parallel to main beam **26** of bow press **310** and is interconnected with each pivot arm bracket **56**, **58** by screw followers **57**, **59** such that simultaneous selective movement of the first and second pivot arms **328**, **330** may be effected along the main beam **26**, toward or away from the midpoint **27** of beam **26**. After the brackets **56**, **58** are positioned along beam **26** so that the ends of the riser **220** of the bow **216** can be supported by brackets **56**, **58**, lock knobs **324** may be used to maintain the positions of the brackets **56**, **58** by impressing set screws against the beam **26**.

Located along first end **261** of beam **26** are spaced apart indicia **262**, namely a series of individual numbers or letters spaced apart evenly to mark locations along first end **261** of beam **26**. Indicia **262** provide locations at which second pivot arm bracket **58** may be set, based on data collected by using bow press **310** to press various models of compound bows. For example, a given model of a bow will have a specific known length of its riser and based on that length, the proper placement of second pivot arm bracket **58** and consequently the placement of first pivot arm bracket **56** to properly support that bow on bow press **310** can be preset.

The embodiment of the bow press **310** of FIGS. **11-17** includes inside surface supports **78**, **84** which may be cushioned rods extending laterally forward from pivot arm brackets **56**, **58** respectively, adapted for contacting inside surfaces **280**, **284** of the limbs **212**, **214** near their connections to the riser **220**. Each inside surface support **78**, **84** therefore serves as a fulcrum for the limb it touches. The invention allows the inside surface support **78**, **84** to be placed as close as possible to the connections of the limbs **212**, **214** to the riser **220**, so that the bow **216** will deflect in the bow press **310** about the interconnection of the limbs **212**, **214** to the riser **220**. Elastic bands **87** selectively may be applied to retain bow **216** to inside surface supports **78**, **84** so that bow **216** may be suspended from bow press **310**. Securing members **340** may be attached to the inside surface supports **78**, **84** once the bow **216** has been suspended therefrom.

Each inside surface support **78**, **84** is attached to the pivot arm bracket **56**, **58** so that its axis is at a short fixed distance inboard of the first pivot axle **42**, **42**, with respect to the midpoint **27** of beam **26**. This closely adjacent but slightly inboard positioning of the first inside surface supports **78**, **84** with respect to the pivot axles **42**, **44** provides an advantageous arrangement for properly supporting the inside surfaces **280**, **284** of the limbs **212**, **214** in a manner that allows the limbs **212**, **214** to flex about inside surface supports **78**, **84** during use of the bow press **310**, in a manner that is very similar to the way the limbs flex when the bow **216** is in normal use.

First end **140** of adjustment rod **64** is coupled to a gear box **142** adapted to allow adjustment rod **64** to be rotated from a perpendicular direction. Specifically gear box **142** houses a spider gear which allows a second crank **118** to apply rota-

tional force to crank coupling **144** of gear box **142** with the result that adjustment rod **64** rotates. As adjustment rod **64** rotates, threaded couplers within each of screw followers **57**, **59** are driven by opposing threads **61**, **67** causing pivot arm brackets **56**, **58** to converge or diverge at equal rates. Thus pivot arms **328**, **330** are symmetrically adjusted to accommodate the length of a bow **216** to be pressed. Because the bow **216** to be pressed in bow press **310** must be supported by the user as the pivot arms **328**, **330** are moved, having a crank coupling **144** facing the holder of the bow **216** eases the chore of adjusting the bow press **310** to fit the bow **216** such that inside surface supports **78**, **84** are positioned just outboard of the limb connections of limbs **212**, **214** to riser **220**. Then elastic straps **87** can be applied to suspend bow **216** from inside surface supports **78**, **84**.

Importantly, gear box **142** at first end **140** of adjustment rod **64** permits rotation of adjustment rod **64** by a user using second crank **118** to rotate the crank coupler **144** while standing in front of bow press **310** and holding bow **216**. This allows the user to easily reposition the pivot arm brackets **56**, **58** while suspending the bow **216** with one hand until the separation of pivot arm brackets **56**, **58** is appropriate so the bow limbs **212** and **214** are supported properly.

As adjustment rod **64** rotates, threaded couplers within each of screw followers **57**, **59** are driven by opposing threads **61**, **67** causing pivot arm brackets **56**, **58** to converge or diverge at equal rates. Thus pivot arms **328**, **330** are symmetrically adjusted to accommodate the length of the riser **220** of a how **216** to be pressed. Because the bow **216** to be pressed in bow press **310** must be supported by the user as the pivot arms **328**, **330** are moved, having hand wheel **274** easily accessible by the holder of the bow **216** eases the chore of adjusting the bow press **310** to fit the bow **216** such that inside surface support members **78**, **84**, which as serve as fulcrums, are positioned just outboard of the limb connections of limbs **212**, **214** to riser **220**. Then elastic straps **87** can be applied to suspend bow **216** from inside limb support fulcrum members **78**, **84**.

The bow press **310** further includes a limb deflector bracket **248** slidingly retained to each of the pivot arms **328**, **330**. A non rotatable support rod **250** extends horizontally from each limb deflector bracket **248**, the support rods **250** being substantially perpendicular to main beam **26**. Each support rod **250** is adapted for receiving a limb cradle **230** on a splined segment **252** of support rod **250** in order to orient each limb cradle **230** to contact an outside surface **282**, **286** of limbs **212**, **214** respectively. Each limb deflector bracket **248** includes a locking mechanism **94** for locking the limb deflector bracket **324** to the respective one of the pivot arms **328**, **330** at a selected distance from the first pivot axle **42**, **44** respectively.

As seen in FIG. **14**, each pivot arm **328**, **330** carries location markings **336**, which in the embodiment of FIG. **14**, are spaced apart letters. Location markings **336** correspond with holes **338** on pivot arms **328**, **330**. As with the indicia **262** of beam **26**, data may be compiled indicating a specific location marking **336** at which the limb deflector bracket **248** should be located for the specific bow model to be compressed.

The locking mechanism in the preferred embodiment shown in FIG. **11** is illustrated in detail in FIG. **14** wherein right hand pivot arm **330** is shown hinged to pivot arm bracket **58**. The user will position limb deflector bracket **248** such that engagement block **230** will abut the outside surface **286** of limb **214** in an appropriate location, as seen in FIG. **11**. Lock knob **324** is then tightened to hold limb deflector bracket **248** in place. Lock knob **324** may be a set screw. A drop in pin **374** may be used to prevent the limb deflector bracket **248** from moving outward along the length of pivot arm **330** if the friction created by lock knob **324** is overcome. A series of location markers **336** along the top surface **332** of pivot arm **330** provides an index of placement of the limb deflector bracket **248** along pivot arm **330** such that the other limb deflector bracket **248** retained to the pivot arm **328** may be set at the same location therealong. Drop in pins **374** are placed in the opening **338** of pivot arms **328**, **330** which is adjacent to the edge of the limb deflector bracket **248** farthest from pivot end **327**, **331** thereof.

It can also be seen in reference to FIG. **14** that pivot arm **330** may be a hollow box tube and that it is formed such that its hinged end **334** is retained to pivot arm bracket **58** by a pivot axle **44** such that pivot arm **330** may swing about pivot axle **44** in a plane which includes the beam **26** and the other pivot arm **328**. It is to be understood that pivot arms **328** and **330** are mirror images of each other and are marked with locations markings **336** similarly, such that when the limb deflector bracket **248** slidable along pivot arm **330** is placed at a position marked "R" for instance, its counterpart on pivot arm **328** will also be placed at position "R". In each case the limb deflector bracket **248** is then locked in place along the respective pivot arm **328**, **330** at the same relative distance from the pivot pin **42**, **44**. Therefore, each limb deflector bracket **248** can be placed at the proper location for the type or model of bow to be pressed, by reference to a cross reference table, such as that of FIG. **16**.

Referring now to FIG. **15**, details of the structure and location of limb cradles **230** used on bow press **310** may be better understood. Each limb cradle **230** includes a first limb engagement block **231** spaced apart from second limb engagement block **232** by a gap **229** sufficient to allow a cam **222** or pulley **225** to be received between them. The limb engagement blocks **231**, **232** are preferably used in pairs and are essentially identical (except for location of index indicators **258** thereon) but arranged so that plungers **238** thereof are located at the outside edges of the limb cradle **230**. Each limb engagement block **231**, **232** receives a splined segment **252** of a support rod **250** within a cylindrical opening **234** of the limb engagement block **231**, **232**, the cylindrical opening **234** being populated with receiving splines **235** such that engagement blocks **231**, **232** may not rotate about splined segment **252** yet limb engagement blocks **231**, **232** may be removed from splined segment **252** and reinstalled thereon at alternative angular positions, or each limb engagement block **231**, **232** may be reinstalled at a differing angular position depending on the needs to accommodate various styles of bow limbs. Bow press **310** can accommodate traditional archery bows which have limbs more aligned with the axis of the risers thereof, by rotating the engagement blocks **231**, **232** sufficiently such that rounded end **247** engages the outer surfaces of the bow limbs.

Preferably, limb engagement blocks **231**, **232** are placed on splined segments **252** such that the bearing surface **236** of each engagement block **231**, **232** will tangentially engage the outside surface **282**, **286** of limbs **212**, **214** respectively, and such that the plunger **238** of each limb engagement block **231**, **232** will be located at the opposing sides of limbs **212**, **214** to prevent the limbs **212**, **214** from sliding off bearing surfaces **236**.

Referring back to FIG. **8**, as seen and described in reference to that figure, plungers **238** of each engagement block **231**, **232** are biased by a spring **239** which is received in a recess **240**. Stop element **242** rides in recess **240** to prevent plunger **238** from escaping from engagement block **231**. A cover **241** is retained to body **243** of each engagement block **231**, **232** by screws **233**.

Referring once more to FIG. **15**, a set of orientation index indicators **256** is marked on each engagement block **231**, **232** near the cylindrical opening **234** thereof. An index spline **257** of the splines **253** surrounding splined part **252** of support rod **250** is permanently marked by color or by other identifying means such as by a nib or recess formed on the end of support rod **250**. The alignment of index spline **257** relative to index indicators **256** may be noted and used for the limb cradles **230** on the opposing side of the bow press **310**, and additionally may be retained in a compilation such as the data table shown in FIG. **16**.

From use of bow press **310** on varying models and makes of bows, the proper orientation of engagement blocks **231**, **232** on support rod **250** may be determined for each model or type of bow **216** to be compressed on the bow press **310**. That information can be entered in a reference table such as table **356** which is exemplified in FIG. **16**.

Referring again to FIG. **11**, it is seen that the bow press **310** further includes a pair of link members **304** joining limb deflection brackets **324** to extensible section **113** of screw jack **50**. Extensible section **113** telescopes from base section **112** of the screw jack **50** in such a manner that when first screw crank **115** is turned, the extensible section **113** of the screw jack **50** extends or retracts from base section **112**.

Link members **304** are identical, each having a first end **306** pivotably attached to the limb deflector bracket **248** and specifically to the support rod **250** carried on the limb deflector bracket **248** of each pivot arm **328**, **330**. Each of link members **304** is irremovably retained to the extensible section **113** of jack **50** by a bolt **316** or other suitable fastener which allows the link members **304** to rotate about their connection to extensible section **113** as the extensible section **113** is raised or lowered. Because the link members **304** are selectively adjustable as to length without having to remove their connections at either end thereof, adjustment of the bow press **310** is facilitated and the potential for injury from slippage of a link from a removable mooring on the jack stand extendible section **113** is removed.

FIG. **12** illustrates each of link members **304** in more detail. Link member **304** includes an outer tube **314** and inner tube **312** and opposing ends **306**, **308**. Opening **305** of each inner tube **312** receives one of the support rods **250**. Opening **307** receives bolt **316** of extensible member **113**. A lock pin **318** secures outer tube **314** to inner tube **312** at a selected extension of inner tube **312** from outer tube **314**. Each link member **304** will be adjusted to the same length, and location markings **320** on the outer tube **314** provide references to specific receiving openings **322** for making each of the link members **304** the same length, and in addition to allow the bow press **310** to be pre-adjusted for the make and model of the bow **216** to be pressed.

The link members **304** are adjusted so that each support rod **250** is equally distant from bolt **316** on jack **50**. The screw jack **50** functions to raise and lower both pivot arms **328**, **330** together thereby exerting force on both support arms **250** and limb cradles **230** and hence applying bending force to the limbs **212**, **214** of bow **216**.

It is to be observed that extensible section **113** of jack **50** is marked with indexing marks **266** such that the user may set the extensible section **113** to a predetermined location as viewed by inspection of the indexing marks **266** on extensible section **113**. The location may be obtained from a chart listing makes and models of bows, such as FIG. **16** illustrates.

FIG. **16** illustrates a reference table **356** which may be used to look up settings for the parts of the bow press **310** which adapt the bow press **310** for a particular make or model of bow. In column **358** the particular compound, short limbed bow to be compressed is listed. The starting location for the extensible section **113** of jack **50** is provided in column **360** opposite the particular bow listed in column **358**. The placement of pivot arm bracket **58** (and resulting placement of pivot arm bracket **56**) along beam **26** may be determined by reference to data in column **362**. Then location of limb deflector brackets **324** along pivot arms **328**, **330** may be preset by reference to data from column **364** of table **356**. The receiving openings **322** to be employed to set the length of link members **304** is determined by reference to column **368** of table **356**. Proper orientation of limb cradles **230** on splined sections **252** of support rods **250** is then accomplished by looking up the proper setting in column **366** corresponding to the bow model listed in column **358**. Orientation of limb cradles **230** is made such that bearing surfaces **234** of engagement blocks **231**, **232** will properly abut outside surfaces **282**, **286** of limbs **212**, **214** when the bow press **310** is operated. Once these settings are made, the bow **216** may be placed on bow press **310** and retained thereto by elastic bands **87**.

Before the bow press **310** is operated and particularly when a bow **216** having solid limbs is to be compressed, a limb securing member **340** may be temporarily attached to each inside surface support **78**, **84**. FIG. **13** shows an enlargement of a securing member **340** in exploded view. Securing member **340** includes a planar base element **342** to which are attached a fixed pin **344** and a movable pin **346**. Fixed pin **344** is secured to base element **342** by inserting the threaded end **345** thereof into threaded opening **341** of base element **342**. The threaded end **347** of adjustable pin **346** is received in slotted hole **343** of base element **342** and may be selectively secured in a spaced apart relationship to fixed pin **344** by locknut **348**. However, second abutment pin **346** is not secured to base element **342** until placement of the securing members **340** on bow press **310**.

The securing member **340** is removably attached to each inside surface support **78**, **84** to serve to secure the bow **216** to the press **310**, specifically by preventing the limbs **212**, **214** from being able to slide downward between the limb cradles **230** when the limbs **212**, **214** have been forced to flex toward one another. For example, inside surface support **84** of second pivot arm bracket **58** includes a coaxial bore **384** into which one of either fixed pin **344** or adjustable pin **346** may be inserted by sliding the pin into the bore **384**. Thereafter the adjustable pin **346** is moved toward fixed abutment pin **341** until the outer surface **282** or **286** of respective limb **212**, **214** is gently abutted by the one of the pins not inserted into the bore **384** of the inside surface support **84**. At that point, the adjustable pin **346** is locked in position on base element **342** by tightening the locknut **348**. Preferably, fixed pin **344** is covered by a cushioning sleeve **350** or alternatively coated with a resilient coating along its unthreaded portion **349** so that it will not mar the outside surface **282** of the limb **214** it engages. Adjustable pin **346** is preferably left uncoated so it can be slid easily into the coaxial bore **384** of the inside surface support **84**. Then the base **342** slides along adjustable pin **346** until fixed pin **344** is touching or almost touching the outside surface of the limb **214**. The lock nut is then tightened to retain the adjustable pin **346** to the base **342** so that the fixed pin **344** remains touching or very nearly abutting the outside surface of the limb **212**, **214**. A securing member **340** is attached to inside surface support **78** in a similar manner.

In the case of a split limb bow to be compressed, alternate limb safety latches (limb retention members **355**) as seen in FIG. **17** may be used. Limb retention members **355**, positioned to pass between the limb elements **288**, **289** of each limb **212**, **214**, provide very secure retention devices to prevent a short-limbed bow **216** from unexpectedly snapping

downward from the bow press **310** when compression of the bow limbs **212**, **214** is applied by the limb engagement blocks **231**, **232**.

FIG. **17** discloses an exemplary limb retention member **355** which is an alternative to the securing member **340** shown in FIG. **13** which is used when a solid limb bow is to be compressed. Limb retention member **355** comprises a bar element **357** selectively retained to a hook element **363** which includes a curved hook segment **367** and a shank segment **361**. Shank segment **361** is narrow enough to pass between split limb elements **288**, **289** of each limb **212**,**214** so that the hook element **363** can be hooked to the first or second inside support rod **78**, **84** of the pivot arm brackets **56**, **58** which is nearest the respective limb **212**, **214**. An adjusting element, e.g, wing nut **365**, allows the bar element **359** to be moved along shank segment **361** and cinched up against the outside surfaces **286** of the split limb elements **288**, **289** once the hook element **363** has been placed over second inside support rod **84** which is adjacent the limb **214**. Likewise another limb retention member **355** is used to secure the limb **212** to first inside support rod **84**.

The free end **369** of the hook segment **363** extends only a small distance past the apex **367** of the hook segment **363**, that is, about fifteen to twenty degrees past the apex **367**, in order avoid the potential for abutment of the free end **369** against the riser **220** when the bow **216** is fully compressed. The free end **369** of the hook segment **363** may be truncated along a line inclined approximately fifteen degrees from the longitudinal axis of the shank segment **361**. The shank segment **361** is threaded so that the wing nut **365** can be used to draw the bar member **357** toward the rod **84**. Because the limb retention member **355** serves to prevent downward motion of the limb **214** relative to the second inside support rod **84**, it needs only to be snug against the limb segments **288**, **289** but need not urge the limb segments **288**, **289** toward the inside support **84**. Therefore the wing nut **365** needs only to be moved a modest amount to allow the hook element to grasp (or release) the rod **84**. It is obviously preferable for the hook element **367** to approximate the diameter of the rod **84** it is meant to partially surround.

Bar member **357** is preferably constructed of cylindrical rod stock and is surrounded by a cushioning sleeve **359** which may be constructed of nylon or other low friction polymer.

OPERATION OF THE INVENTION

In preparation for use of the bow press **310** for a particular short limbed, compound bow **216**, the jack **50** is adjusted to a starting position by lowering extensible section **113** to the height according to the indexing mark **266** observed in column **364** of table **356** for the particular model of bow **216**. Then placement of the pivot arm brackets **56**, **58** is set along beam **26** by turning of the threaded rod **64**, according to the location information in column **358**. This positioning of the pivot arm brackets **56**, **58** arranges the inside surface supports **78**, **84** to be located at the junctions of the riser **220** with the limbs **212**, **214**. The pivot arm brackets **56**, **58** are frictionally locked to the beam **26** by lock knobs **324**. Then pivot arms **328**, **330** are lowered by removing the drop in pins **318** from link members **304** to allow link members **304** to extend until pivot arms **328**, **330** rest upon beam **26**. Then the location of each limb deflector bracket **248** along pivot arms **328**, **330** is set by reference to data in column **360** of Table **356**. Lock elements **94** (set screws) are tightened slightly to maintain the locations of limb deflector brackets **248**. Lock pins **339** are placed in the appropriate holes **338** of pivot arms **328**, **330** such that the limb deflector brackets **248** cannot move outward along pivot arms **328**, **330**. The limb engagement blocks **231**, **232** are then oriented on support rods **250** by reference to data in column **364** such that the index splines **257** are aligned with index indicators **258** on the limb engagement blocks **231**, **232**. Then, the pivot arms **328**, **330** are raised manually and the lengths of link members **304** are set according to data from column **362**, thereby drawing the pivot arms **328**, **330** upward so that limb cradles **230** approach or gently abut limbs **212**, **214**. When the compound bow is equipped with solid limbs, securing members **340** may be applied to the inside surface supports **78**, **84** thereby capturing the bow **216** to the bow press **310**. In the case where the limbs **212**, **214** are of the split-limb variety, then retention members **355** are applied to lock each limb **212**, **214** to the respective inside surface support **78**, **84**.

After the bow **216** is fitted to the bow press **310**, jack **50** may be adjusted by extending extensible section **113** to a sufficient height so that tension on the bow string **218** is released and the bow string **218** and other parts of the bow may be serviced or adjusted.

When servicing of the bow **216** is complete, the extensible section **113** is lowered to relieve compression forces on the limbs **212**, **214** and the securing members **340** are removed after the locknuts **349** thereof are loosened to the extent that the second abutment pin **346** may slide along slotted hole **343** away from fixed abutment pin **344**.

The foregoing description of the invention has been presented for purposes of illustration and description and is not intended to be exhaustive or to limit the invention to the precise form disclosed. Modifications and variations of the embodiments are possible in light of the above disclosure or such may be acquired through practice of the invention. The embodiments illustrated were chosen in order to explain the principles of the invention and its practical application to enable one skilled in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the claims appended hereto, and by their equivalents.

What is claimed is:

1. Apparatus to selectively deflect limbs of an archery bow, the invention comprising

an elongate generally horizontal beam,

first and second brackets slidably retained to the beam,

the first and second brackets slidable along the beam at equal rates in opposing directions,

each of the first and second brackets comprising an elongate support member extending laterally therefrom,

each elongate support member engageable with an inside surface of a one of the limbs of the archery bow,

a first pivot arm hinged to the first bracket,

a second pivot arm hinged to the second bracket,

each elongate support member having an axis substantially perpendicular to a plane defined by the pivot arms and the elongate beam,

a first support bracket retained to the first pivot arm and selectively slidable therealong,

a second support bracket retained to the second pivot arm and selectively slidable therealong,

a limb engaging member supported on each support bracket to touchingly engage an outside surface of one of the limbs of the archery bow and to selectively urge the one of the limbs of the archery bow toward the other limb,

a first elongate link hinged to the first support bracket,

a second elongate link hinged to the second support bracket,

an extendible length member disposed at substantially a midpoint of the horizontal beam,

the extendible length member having a selectively extensible member,

the first and second links hinged to the extensible member,

each limb engaging member comprises a cylindrical rod,

each cylindrical rod being elongate and having a longitudinal axis substantially perpendicular to the plane defined by the pivot arms and the elongate beam,

each cylindrical rod having a free end,

a limb support cradle selectively receivable on each of the cylindrical rods,

each limb support cradle including a cylindrical opening for receiving the cylindrical rod on which the limb support cradle is receivable,

each limb support cradle nonrotatable about the cylindrical rod on which it is received,

each limb support cradle including a bearing surface touchingly engageable with an outer surface of one of the limbs of the bow.

2. The apparatus of claim **1** wherein

each elongate link is irremovably hinged to the extensible member.

3. The apparatus of claim **1** wherein

each of the links is longitudinally adjustable without disconnection of either end thereof from the apparatus.

4. The apparatus of claim **1** wherein

each of the first and second elongate links comprises an outer tube and an inner tube,

the inner tube telescopingly slidable within the outer tube,

a one of the outer tube and the inner tube including multiple openings therealong,

at least one opening along the other of the outer tube and the inner tube,

the at least one opening alignable with a selected one of the multiple openings,

a pin element selectively insertable through the selected one of the multiple openings and the at least one opening to selectively lock the inner tube to the outer tube,

each opening of the multiple openings is associated with a distinct identifying element marked on a one of the inner tube and the outer tube.

5. The apparatus of claim **1** wherein

each cylindrical rod includes plural external longitudinal splines thereon,

the external splines extending around an entirety of an outer surface of each of the rods,

the cylindrical opening of each limb support cradle comprising internal splines meshable with the external splines of the rods,

the internal splines disposed about a circumference of the cylindrical opening of each limb support cradle.

6. The apparatus of claim **5** further characterized by

each limb support cradle comprising a pair of spaced apart limb engaging elements,

each limb engaging elements including a bearing surface for touchingly engaging a one of the limbs of the bow,

the pair of limb engaging elements of each limb support cradle defining a gap therebetween.

7. The apparatus of claim **6** wherein

each limb engaging element includes a spring biased plunger extending therefrom adjacent the bearing surface thereof,

the plunger extending past the bearing surface when the plunger is fully extended,

the limb engaging elements of each limb support cradle oriented such that the plungers thereof are disposed at outside edges of the limb support cradle.

8. The apparatus of claim **1** wherein

a limb retaining member is selectively mounted to each of the elongate support members,

each limb retaining member comprises a first pin and a second pin, the first pin being generally parallel to and selectively spaced apart from the second pin,

the first pin selectively mountable to the elongate support member and the second pin selectively movable into engagement with the outer surface of a one of the limbs of the bow.

9. The apparatus of claim **1** wherein

a limb retaining member is selectively mounted to each of the elongate support members,

each limb retaining member comprises a hook member having a curved hook joined to a shank, and a transverse bar selectively retained to the shank,

the hook selectively retained to a one of the elongate support members,

the transverse bar selectively movable along the shank to touchingly engage the outer surface of a one of the limbs of the bow.

10. The apparatus of claim **1** wherein

a lock element is cooperative with each support bracket to selectively prevent the support bracket from moving along the pivot arm.

11. The apparatus of claim **10** wherein

each pivot arm includes a series of pin receivers therealong,

each lock element comprises a pin insertable into a one of the pin receivers of the pivot arm to which the limb engagement bracket is slidably retained,

each pin receiver of each pivot arm is identified with an identifier observable by a user.

12. The apparatus of claim **1** wherein

each limb support cradle includes a plurality of indices disposed about the cylindrical rod receiving opening thereof,

the indices fixed to each of the limb support cradles,

one of the external splines of each cylindrical rod being an index spline,

the index spline being marked with an identification mark affixed to the cylindrical rod,

wherein each limb support cradle may be oriented on the rod on which it is received such that the index spline of the rod is aligned with a specific one of the indices of the limb support cradle.

13. The apparatus of claim **1** wherein

each of the cylindrical rods including at least one first keying element thereon,

the rod receiving opening of each limb support cradle including at least one second keying element,

each first keying element complementary with each second keying element,

the rod receiving opening of each limb support cradle receiving the cylindrical rod on which the limb support cradle is supported,

the first and second keying elements preventing rotation of the limb support cradle around the cylindrical rod on which it is supported.

14. The apparatus of claim **1** wherein

each link member includes a plurality of attachment points thereon, attachment point,

each individual identifier marked on each of the link members,

the beam comprising a plurality of indicia marked thereon,

each of the indicia marking a location along the beam for location of a one of the pivot arms therealong, the other of the pivot arms moving to a point correspondingly separated from the extendible length member as the one of the pivot arms is separated from the extendible length member,

each pivot arm including indicators therealong,

the indicators on each pivot arm marked on the pivot arm,

the indicators marking specific points along the pivot arm for location of the support bracket therealong,

the extensible member of the extendible length member including indexing marks fixed therealong,

wherein the bow press may be preset based upon a type or model of bow to be pressed before attachment of the bow thereto, by adjusting the links so that each link member is set to a length corresponding with a one of the individual identifiers, by adjusting the extensible member to a starting height, and by locating the support brackets along the pivot arms in accordance with a one of the indicators on each of the pivot arms.

15. The apparatus of claim **1** wherein

the first and second brackets are slidable along the beam at equal rates in opposing directions as a threaded rod coupled to the first and second brackets is rotated,

the threaded rod having a first end with right hand threads thereon,

the right hand threads coupled to a first of the first and second brackets by a first screw follower,

the threaded rod having a second end with left hands threads thereon,

the left hand threads coupled to a second of the first and second brackets by a second screw follower,

the threaded rod supported by a central bracket depending from the beam,

the threaded rod extending substantially the entire length of the beam,

a gear box coupled to an end of the threaded rod,

the gear box housing a spider gear,

a crank member selectively operatively coupled to the gear box,

the crank member rotatable about a drive axis, the drive axis substantially perpendicular to a longitudinal axis of the threaded rod,

the spider gear coupling the crank member to the threaded rod.

16. In a bow press having an elongate beam, a pair of pivot arms retained to the beam and selectively moveable thereallong, the pivot arms pivotable upon the beam, each pivot arm having an elongate link member hinged thereto, the elongate link members each being selectively joined along distal ends thereof to an extensible section of a telescoping member, the improvement comprising

each link member including a plurality of attachment points thereon,

each attachment point identified by an individual identifier specific to the attachment point,

each individual identifier marked on the link member adjacent each attachment point of the plurality of attachment points,

the beam comprising indicia thereon,

the indicia marking locations along the beam for location of at least one of the pivot arms therealong,

the indicia fixed along at least a first half of the beam,

each pivot arm including indicators therealong,

the indicators marking specific points along the pivot arm for location of a limb support bracket therealong,

each indicator marked on each pivot arm adjacent a specific one of the specific points along the pivot arm,

each link member hinged to one of the limb support brackets,

the extensible section of the telescoping member including indexing marks affixed therealong,

whereby the bow press may be preset based upon a type or model of bow to be pressed,

each pivot arm supports a limb engaging member thereon,

each limb engaging member selectively supporting a limb cradle thereon,

each limb cradle comprising a pair of limb cradle members,

each limb cradle member including a cylindrical opening,

the cylindrical opening including internal splines thereabout,

each limb engaging member comprising a cylindrical rod,

the cylindrical rod having external splines thereon, the external splines surrounding a longitudinal segment of the cylindrical rod,

orientation markings disposed on the limb cradle,

the orientation markings disposed adjacent the cylindrical opening of each limb cradle member,

at least one index mark on the limb engaging member,

the at least one index mark fixed to the cylindrical rod and aligned with a one of the splines thereof,

wherein each limb cradle may be oriented on the limb engaging member at a predetermined orientation by alignment of the at least one index mark with a selected one of the orientation markings on the limb cradle.

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